

Project Description

Northwest Passage – In the Footsteps of Roald Amundsen

**From Kangerlussuaq, Greenland to Nome, Alaska USA
20 August – 11 September 2019**



MS ROALD AMUNDSEN

**Developer:
Hurtigruten Cruise AS**

**Prepared for:
Nunavut Planning Committee
Nunavut Impact Review Board
Environmental Impact Screening Committee
Environmental Impact Review Board**

Table of Contents

Section:

- 1 Title
- 2 Contact Name and Address
- 3 Approvals – Regulatory and other Permits/Licenses/Authorizations
- 4 Summary of the Project Description
- 5 Company Background and Special Operations Staff
- 6 Summary of the Proposed Development
 - 6.a. Overview
 - 6.b. Project Location
 - 6.c. Voyage Plans and Route Map
 - 6.d. Appointed Port Agent
 - 6.e. Proposed Activities at Project Location
 - 6.f. List of Equipment to be Used
 - 6.g. Environmental Practices
 - 6.h. Fuel and Hazardous Material Use
 - 6.i. Waste Disposal and Treatment Methods
 - 6.j. Spill Prevention Plan
 - 6.k. Expedition Management
 - 6.l. Operations Ashore in Communities
 - 6.m. Expedition Activities Away from Communities
 - 6.n. SAR Arrangements, Emergency Response and Contingency Planning
 - 6.o. Security Plan
 - 6.p. Wildlife Protection
 - 6.q. Special Clothing and Equipment
 - 6.r. Traditional Knowledge - Inuit Qaujimajatuqangit
 - 6.s. Giving Back to the Communities
- 7 Developer's Commitments
- 8 Technology
- 9 Alternatives
- 10 Description of the Biophysical Environment - Ulukhaktok
- 11 Traditional and Other Land Uses / Potentially-Affected Communities
- 12 Community, Co-Management, Inuvialuit Organizations and Government Engagement and Consultation
- 13 Analysis of Potential Significant Negative Environmental Impacts
- 14 Cumulative Environmental Impacts
- 15 Likely Environmental Impacts: Assessment, Minimization and Mitigation of Proposed Activities
- 16 Clean-up, Reclamation, Disposal and/or Decommissioning Plans
- 17 Additional Information

Appendices:

- Appendix A: Voyage Plan (Voyage AMNWP1911)
Appendix B: Route Map
Appendix C: Alternative Itineraries
Appendix D: MS ROALD AMUNDSEN Vessel Questionnaire
Appendix E: Expedition Staff List and Biographical Sketches (current as of submission date)
Appendix F: Guidelines for Visitors to Archaeological and Historical Sites

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

1. Title:

MS ROALD AMUNDSEN, Northwest Passage - In the Footsteps of Roald Amundsen, Kangerlussuaq to Nome, 20 August - 11 September 2019 (Voyage AMNWP1911)

2. Contact Name and Address

Hurtigruten Cruise AS
Postbox 6144
Tromsø, Norway N-9291
Contact Name: Karin Strand
Contact Title: Vice President Explorer Operations
Tel: +47 970 57 030
Cellular: +47 917 03 463
Fax: N/A
Email: Karin.Strand@hurtigruten.com
Website: <http://www.hurtigruten.com>

OUTSIDE CONSULTANT:

Expedition Cruise Experts & Logistics
PO Box 389
Manson Washington 98831 USA
Website: www.excelinc.us

Preparer:
Contact Name: Victoria Wheatley
Contact Title: Consultant
Mobile: +001 858 699 8867
Email: Victoria@excelinc.us

Ms. Wheatley has been active in the expedition cruise industry since 1986 and has participated in well over 150 sea voyages to remote destinations around the world including all seven continents. She has authored a number of Environmental Impact Assessments and Project Descriptions for the Canadian Arctic and is sought after for her expertise with permitting and regulatory matters and for planning ship operations in remote and sensitive sea areas.

This assessment has considered the range of activities as disclosed by the Operator at the time of submission. New activities will be elaborated upon as information becomes available and the details advised in updates as appropriate. Any activities not assessed are the responsibility of the Operator.

3. Approvals – Regulatory and other Permits / Licenses / Authorizations

Federal:

- EC-CWS Application for National Migratory Bird Sanctuary Permit: Prince Leopold Island Migratory Bird Sanctuary * pending
- Worker's Coverage (WSCC Exemption) * pending
- Labour Market Impact Assessments and Crew Work Permits * pending (for expedition staff and crew who will be working ashore)
- Transport Canada Equivalency Certificate * pending
- Public Health Agency of Canada * decision pending on health inspection

Territorial:

- Nunavut Planning Commission * pending (File #149064)
- Nunavut Impact Review Board screening * pending
- Government Nunavut:
 - o Tourism Outfitters License * pending
 - o Consent to Public Disclosure of Tourism Information * pending
 - o Economic Benefits Pre and Post Report (Cambridge Bay and Pond Inlet) * pending
 - o Registration as an Extra-Territorial Corporation * pending
 - o Class 1 Archaeological Permit (Dept. of Culture & Heritage) * pending
 - o Wildlife Observation License (Dept. of Environment) * pending
- Qikiqtani Inuit Association:
 - o Land Use License * pending

Notifications to:

- Hamlets of: Pond Inlet, Gjoa Haven and Cambridge Bay (via Community Economic Development Officers) * pending
- Kitikmeot Inuit Association * pending
- Qikiqtani Inuit Association * pending
- Inuit Heritage Trust * pending
- Hunters and Trappers Organizations/Associations in Pond Inlet (Mittimatalik HTO), Gjoa Haven (Gjoa Haven HTO) and Cambridge Bay (Ekaluktutiak HTO) * pending

The Northwest Territories:

- Environmental Impact Screening Committee / Environmental Impact Review Board
- Gov't of the Northwest Territories:
 - o Business License (Dep't of Industry, Tourism & Investment) * pending
 - o Tour Operator License * pending
- Inuvialuit Land Administration Land Use Permit * pending
- Olokhaktomiut Hunters and Trappers Committee Letter of Support * pending
- Ulukhaktok Community Letter of Support * pending

4. Summary of the Project Description

Hurtigruten Cruise AS' (hereafter Hurtigruten's) Norwegian-flagged cruise ship MS ROALD AMUNDSEN (hereafter ROALD AMUNDSEN) has advertised and is selling on the retail market the following voyage:

"Northwest Passage - In the Footsteps of Roald Amundsen," Kangerlussuaq to Nome, 20 August - 11 September 2019 (Voyage AMNWP1911)

Details: <https://www.hurtigruten.com/destinations/northwest-passage/in-the-footsteps-of-roald-amundsen/>

The vessel is anticipated to carry up to 480 passengers (guests) and 170 crew (including approx. 20 members of the expedition team). Additionally, there will be one contracted ice pilot aboard to assist the Master and navigation team. (Ref. Section 5.)

The Voyage Plan has been included as **Appendix A**. The Route Map is included as **Appendix B**.

NOTE: Alternative itineraries have also been planned in the event that ice requires changes to the itineraries. These have been included as **Appendix C**.

A vessel questionnaire has been included as **Appendix D**.

Itinerary overview:

The voyage begins in Kangerlussuaq, Greenland on 20 August 2019 and is scheduled to end in Nome, Alaska, USA on 11 September 2019. The voyage plans to follow the traditional Northwest Passage route by way of Nunavut and the Northwest Territories. The cruise itinerary is highly dependent on weather, ice and other factors. Project duration in Nunavut is eight days (see below), from 26 August to 02 September. The vessel also plans to visit the Northwest Territories from 04 to 05 September with an organized port call at Ulukhaktok on 04 September and an expedition day at Smoking Hills on 05 September. The voyage is scheduled to end in Nome, Alaska on 11 September.

During the vessel's time in Nunavut, the following itinerary is planned:

26 August – Pond Inlet / Cruise Eclipse Sound
27 August – Dundas Harbour (Devon Island) / Croker Bay
28 August – Beechey Island / Prince Leopold Island Migratory Bird Sanctuary
29 August – Fort Ross (Somerset Island)
30 August – Fort Ross (Somerset Island) / Conningham Bay
31 August – James Ross Strait
01 September – Gjøa Haven
02 September – Cambridge Bay

Customs and immigration procedures will be handled at Pond Inlet (with clearance into Canada).

For the entire cruise from Greenland to Alaska, an Inuit Beneficiary, Ms. Ashley Cummings from Pangnirtung, NU, will serve as a cultural interpreter and guest lecturer (see **Appendix E**). When in communities in Nunavut and in Ulukhaktok (Northwest Territories), local services will be contracted, and guides employed.

Activities feature a combination of on board and off ship activities with the goal being to provide a well-rounded educational experience. Activities include educational presentations, small boat cruising, guided kayaking excursions and shore landings in communities where pre-arranged visits and activities have been arranged as well as wilderness areas away from communities for small group guided exploration.

Section 6 provides a Summary of the Proposed Development. The Equipment to be used is provided in Section 6.f. Operations have been planned to be fully self-sufficient and according to Canadian legislation, with activities managed by experienced officers, crew and expedition staff and to be within the search and rescue (SAR) capability of the Operator, including for medical evacuation, if required. Further details are provided in Section 6.n. Details on Expedition Operations (Activities Away from Communities) is provided in Section 6.m.

Section 7 provides information on the Operator's commitments. Section 8 deals with Technology, including new technologies (ref. also Section 6.f.).

Section 9 identifies alternatives that have been considered including:

- Alternative 1: Changes to itinerary
- Alternative 2: Changes to number of guests
- Alternative 3: Changes to vessel and auxiliary craft used
- Alternative 4: Changes to activities
- Alternative 5: Alternative of not proceeding with the planned cruise program

None of these alternatives are justified and all have been rejected for environmental, logistic or commercial reasons.

Section 10 provides a Description of the Biophysical Environment for Ulukhaktok (as requested by the EISC). Section 11 identifies traditional and other land uses and potentially affected communities. Section 12 identifies community, co-management, Inuit organizations and government engagement and consultation.

Section 13 provides an analysis of potential significant negative environmental impact; Section 14 any likely cumulative environmental impacts. Section 15 the likely environmental impacts, including an assessment and minimization and mitigation that could likely result from each proposed activity.

Section 16 discusses clean-up, reclamation disposal and/or decommissioning plans.

Section 17 provides additional information.

A series of Appendices is included to provide further information.

Conclusion:

Direct, indirect and cumulative impacts of the proposed activity have been considered, as have alternatives. Provided that minimization and mitigation measures are adhered to, it is concluded that the proposed activity will have not more than a minor or transitory impact on the environment to be visited, including associated and dependent ecosystems, and that the activity should be authorized/permitted to proceed.

5. Company Background and Special Operations Staff

Company background:

Hurtigruten is one of the world's leading operators in exploration travel in polar waters. With a large fleet of vessels, Hurtigruten explores Antarctica, Greenland, Svalbard, Iceland, Norway, the Canadian Arctic, Eastern Canada and occasionally offers the Northwest Passage as with MS ROALD AMUNDSEN during summer 2019. Hurtigruten operates the classic coastal route on the Norwegian coast, known as "The world's most beautiful voyage". The route between Bergen and Kirkenes is operated by 11 ships, with daily departures from Bergen in an 11-day rotation, year-round schedule. Hurtigruten's Expedition vessel MS FRAM (2007) runs expedition cruises to polar destinations such as Canada, Greenland, Iceland, Svalbard, Antarctica, and destinations in-between. The ship has a maximum capacity of 318 guests, experienced expedition staff and a wide portfolio of onboard activities, landings and excursions. MS MIDNATSOL was brought into service as an Expedition vessel in 2016/17 in Antarctica and significantly expanded capacity with a maximum guest complement of 500. The smaller MS SPITSBERGEN, with about 160 guests, was rebuilt and put into Arctic Expedition service from the 2016 season. In 2019 the state-of-the-art vessel, MS ROALD AMUNDSEN, joined the Hurtigruten Expedition fleet. The vessel features new energy storage technology (batteries) that will reduce fuel consumption and showcase hybrid propulsion on vessels of this size. The similar MS FRIDTJOF NANSEN is being built. In addition, Hurtigruten owns the travel operator Hurtigruten Svalbard (formerly Spitsbergen Travel), located in Longyearbyen. Offering land based all year Arctic experiences, including conference facilities, group tours and individual programs, Hurtigruten Svalbard owns Spitsbergen Travel Hotel AS, running three hotels in Longyearbyen.

Details on the company can be found at www.hurtigruten.com

Information on ROALD AMUNDSEN may be found at <https://www.hurtigruten.com/our-ships/ms-roald-amundsen/>. Refer also to Section 6.f.

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Hurtigruten is a full (voting) Member in good standing of the Association of Arctic Expedition Cruise Operators (www.aeco.no), having joined the association in 2007. Founded in 2003, AECO is an international association for expedition cruise operators operating in the Arctic and others with interests in this industry. The association is dedicated to managing responsible, environmentally-friendly and safe tourism in the Arctic and strives to set the highest operating standards.

Hurtigruten operations staff:

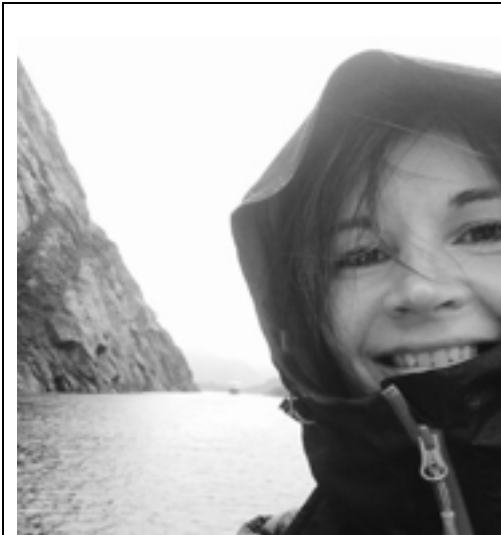
Hurtigruten's operations staff, at all levels, have extensive background and experience in applying specific measures to avoid environmental impacts. The employees for whom biographical sketches are provided will be actively involved in planning, managing and operating the planned cruise of ROALD AMUNDSEN.

Ms. Karin Strand
Vice President Expedition and Expedition Leader



Karin grew up among the Norwegian Fjords and glaciers in Jølster. She moved to Bergen in 1991, where she studied law at the University of Bergen. Karen changed her career plans due to passion of traveling and the oceans. No better place to be than Hurtigruten. She has worked on various ships in the fleet on various routes. Karen joined MV Nordnorge's first adventures to Chile & Antarctica in 2002. Karen suffers from permanent polar fever and roams the Polar Regions south and north throughout the year from Greenland, Svalbard and Antarctica, both when she is on the ship and in her time off. She is a keen kayak paddler and spends a lot of her time paddling in oceans and rivers in different parts of the world. A three-week Antarctica paddling journey was completed in 2016. Hiking is another passion. In 2013, she and two friends walked the Arctic Circle Trail in Greenland: 163km in 8 days carrying all of their food, tent, etc., in their backpacks. The polar fever gets stronger every year.

Ms. Guro Storhaug Christiansen
Operations Manager Maritime Operations




Guro joined Hurtigruten three years ago after working with operations and safety in the offshore industry for 10 years. Working at Hurtigruten brings her back to the origin and the main reason for wanting a career as a naval architect; namely ship design and marine safety. She currently holds the position as Operations Manager for Hurtigruten's Expedition ships.

Mr. Tudor Morgan
Field Operations Manager and Expedition Leader




Tudor has always had a passion for polar places. After many Arctic and Alpine expeditions while studying Geology at Manchester University he first went South with British Antarctic Survey wintered as a Field Guide before becoming became Field Operations Manager. After six years he moved on to work for the Antarctic Heritage Trust managing the operation at Port Lockroy and overseeing the conservation of other historic sites. Before joining the full-time staff at Hurtigruten he was Operations Manager at IAATO – the International Association of Antarctica Tour Operators. He has been awarded the Queens Polar Medal for outstanding service to Antarctic science and Heritage.

Dr. John Chardine
Chief Naturalist and Expedition Staff Member


	<p>John is Canadian and has been with Hurtigruten since 2002 as an expedition staff member. More recently he joined the shore team as Chief Naturalist dealing with all aspects of our on-board naturalists' program, Arctic permits, educational content, and other projects. Since the mid-1970s he conducted research on seabirds which took him to Arctic Canada for the first time in 1987 with the Canadian Wildlife Service. He spent parts of two summers working on seabirds nesting at Prince Leopold Island and Coburg Island. He has been returning to the Arctic regularly ever since. He has published many papers on seabirds including a report on the effects of tourism on seabirds with the Arctic Council's Conservation of Arctic Flora and Fauna working group. He has also been traveling to Antarctica annually since 1995 and is very familiar with expedition cruise ship tourism in polar regions.</p>
---	---

Captain Kai Albrigtsen
Master, MS ROALD AMUNDSEN

	<p>Kai Albrigtsen decided at an early stage that he would like to work at sea as part of his family tradition. His father, grandfather and forefathers were all seafarers. He started his career in Hurtigruten Cruise AS galley boy in 1980, then as deckhand, AB and in the engine room. He studied and then graduated from maritime school in 1999, since then he has served on almost all Hurtigruten ships as an officer and as Captain since 2009 including two Antarctic seasons and taking MS FINNMARKEN down to Australia. He has a passion for sailing and the sea. His main focus is on safe navigation and environmental-friendly operation in remote areas. He loves to be part of Hurtigruten Expedition program either at the coast of Norway under the Northern lights or in Antarctica among ice and wildlife. He looks forward to taking you to the most fantastic places on the planet – Welcome onboard.</p>
---	--

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Captain Benny Didriksen
Master, MS ROALD AMUNDSEN

	<p>Benny Didriksen was born and raised in a seaman's family in northern Norway. He spent his early summer vacations on board the ships his parents worked on, especially at Hurtigruten ship MS LOFOTEN. In his teens, he started his nautical studies that he completed in 1993. Since then, he has worked as an officer worldwide on tankerships, offshore and AHTS vessels in the North Sea. He joined MS NORDNORGE in 2003 and has worked with Hurtigruten since then, as Captain since 2015. He has ten Antarctic seasons and seven Arctic seasons and is very eager to get more. Hurtigruten's Expedition programme has become an important part of his life where he regards the development of safe and environmental-friendly travel for Hurtigruten's guests to be of highest importance.</p>
---	---

The navigation team of ROALD AMUNDSEN will be accompanied at all times, from Pond Inlet until Nome, Alaska, by a highly experienced Canadian ice pilot (ex. Canadian Coast Guard). The ice pilot will be contracted approx. one month prior to sailing. Details on his/her background and ice experience can be provided at that time if this information is desired.

6. Summary of the Proposed Development

6.a. Overview

This project description aims to provide a non-technical summary and to evaluate environmental aspects of Hurtigruten's proposed project development in Nunavut during summer 2019 with their expedition cruise ship, ROALD AMUNDSEN, and to ensure compliance with requirements under Canadian and Territorial legislation in the areas the vessel will visit.

Details on the voyage, including a web reference, have been provided in Section 5. The Operator intends to transit through Nunavut waters, to the Qikiqtani and Kitikmeot Regions, with one passenger vessel (ROALD AMUNDSEN) for one voyage and to visit also the Beaufort Delta Region of the Northwest Territories.

Expedition stops in wilderness areas are planned. Details have been included in Section 6.m. Pre-arranged visits to communities (Pond Inlet, Gjøa Haven, Cambridge Bay and Ulukhaktok are also planned (ref. Section 6.l.)).

The voyage is proposed to occur during a period of minimum sea-ice in Nunavut and Northwest Territories waters. Sea-ice will be avoided if at all possible.

It is not anticipated that wildlife habitat will be disturbed.

The scope of the project includes the following undertakings, works or activities within the Nunavut Settlement Area and the Beaufort Delta Region of the Northwest Territories for:

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

- Transportation and accommodations for approximately 650 people (up to 500 guests and 151 crew, which includes an expedition staff of 20 and one ice pilot), aboard the MS ROALD AMUNDSEN;
- Storage of approximately 611 m³ (550 m. tones) of marine diesel fuel aboard the vessel; usage to be determined.
- Use of up to 15 Oxe tender boats (with capacity for 19 persons each including the driver), small auxiliary boats for short sightseeing excursions and ship-to-shore transportation;
- Auxiliary boat engines are Oxe 150HP diesel outboards. Each boat stores 50 L in an onboard tank. Fuel use during each excursion (based on 15) is to be determined (the vessel is a new build);
- Use of up to 12 double kayaks plus 6 single kayaks for sightseeing kayak excursions;
- Shore landings, via cruise ship or small auxiliary boats,
- Shore-based activities in wilderness areas (apart from communities)
- Pre-arranged community visits at four locations (as noted).

Information on the expedition team staffing has been included in Section 6.k. and in **Appendix E**, however the staffing was still being finalized at the time of this submission, so changes may occur between now and sailing.

The cruise has been planned with a high degree of sensitivity to the local communities. As previously advised, community visits have been planned for Pond Inlet, Gjøa Haven, Cambridge Bay and Ulukhaktok. As stated in Section 4, for the entire cruise, an Inuit Beneficiary, Ms. Ashley Cummings from Pangnirtung, NU, will serve as a cultural interpreter and guest lecturer. When in communities in Nunavut and in Ulukhaktok (Northwest Territories), local services will be contracted, and guides employed. Consideration has also been given to Traditional knowledge - *Inuit Qaujimajatuqangit*, and potential impact to communities nearby. Principals from the Company (ref. Section 5) are active in the industry and have worked with local and emergency officials at the federal, regional, and local levels to discuss and finalize plans for the trip. Details are provided elsewhere in this document.

Where applicable, Federal and/or Territorial permit, license and authorization applications will be submitted in advance to the appropriate authorities; copies will be carried on board.

The possibility of potential impacts will be minimized by strict adherence to applicable laws and regulations; company policies and standard operating policies; careful pre-trip planning and briefings; advice received from the Nunavut Planning Commission and Nunavut Impact Review Board and the Northwest Territories Environmental Impact Screening Committee and Environmental Impact Review Board; public and community input; and implementation of mitigation measures and the supervision and monitoring of visitor activities in the field by experienced personnel. It is anticipated that the proposed voyages will have an environmental impact that is not more than minor or transitory.

Expedition operations (activities away from communities) are detailed in Section 6.m. Site visits will occur in strict adherence with applicable regulations, permit conditions and/or guidelines.

A team of lecturers and naturalists will provide an in-depth educational program through a series of onboard enrichment presentations and briefings and in small group guided field interpretation. Local guides will be hired, where possible. Site visits will occur in strict adherence to applicable regulations, permit conditions and/or guidelines, and community invitations/advice. Guests will be briefed in advance and activities closely monitored.

6.b. Project Location

In Nunavut, the vessel will transit through the offshore and marine environment and visit the Qikiqtani and Kitikmeot regions between the dates of 26 August to 02 September. The appropriate permits and licenses

will be obtained, along with authorizations/approvals. Letters of introductions will be forwarded in advance to the communities to be visited, communities closest to where activities will occur and to the appropriate Hunters and Trappers Associations/Organizations and to Inuit Heritage Trust.

In the Northwest Territories, the vessel will visit transit through the offshore and marine environment. While visiting the Municipality of Ulukhaktok (on 04 September) the visit will be to Crown Land. The vessel will sail by Cape Parry, outside the Migratory Bird Sanctuary, but inside the Anguniaqvia niqiqyuam Marine Protected Area, for which permission to enter will be applied for. The plan is then to land at Smoking Hills, for which permission from the Inuvialuit Land Administration will be sought in advance since this is within the Inuvialuit Settlement Region (ISR) and on private lands. A letter of introduction will be forwarded to the Olokhtomiut Hunters and Trappers Committee to inform of project activities and to obtain a letter of support.

At Ulukhaktok, all guest-related activities will be conducted in the area immediately surrounding the community, defined as a box enclosed by the following points:

70°50'N, 118°0'W

70°30'N, 118°0'W

70°50'N, 117°0'W

70°50'N, 117°0'W

6.c. Voyage Plans and Route Map

The Voyage Plan is included as **Appendix A**. Arrival to port is subject to weather, ice, and other conditions.

A preliminary Route Map is attached as **Appendix B**. The route taken will be subject to change based on weather, ice and other conditions.

Alternative itineraries have been included as **Appendix C**.

6.d. Appointed Port Agent

Hurtigruten's appointed port agent for ROALD AMUNDSEN is:

Inchcape Shipping Services

General Address:

620 Bord du Lac

Suite 304

Dorval, Quebec, Canada H9S 2B6

Phone: [+1 514 861 1216](tel:+15148611216) (24 Hours)

Fax: [+1 514 861 1113](tel:+15148611113) or [+1 866 421 9374](tel:+18664219374)

Telex: 6737679 ISS MTL (US Telex No.)

Email: iss.montreal@iss-shipping.com

Jason C. Skorski

General Manager - Eastern Canada

Inchcape Shipping Services

(As Agents Only)

Office: [+1 514 861 1216](tel:+15148611216) - 24 hours

Fax: [+1 866 421 9374](tel:+18664219374)

Telex: 6737679 U.S. Telex Number

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Mobile: [+1 514 236 0017](tel:+15142360017)
Office Email: iss.montreal@iss-shipping.com
Personal Email: jason.skorski@iss-shipping.com
Website: www.iss-shipping.com

6.e. Proposed Activities at Project Location

The location of the planned activities has been outlined in Sections 4 and 6.b. The proposed activities feature a combination of small auxiliary boat cruises, wilderness shore landings with visits conducted in small groups, pre-organized community visits and guided kayaking excursions. The proposed shore landings will be guided by members of the expedition team and with groups rotated throughout the duration of the landing. Further information may be found in Sections 6.l. and 6.m. Kayaking will be offered to limited numbers of participants in select locations, dependent upon favorable weather conditions. Further information may be found in Sections 6.f. and 6.m.

6.f. List of Equipment to be Used

MS ROALD AMUNDSEN

Detailed information on the vessel has been included in a Vessel Questionnaire, which has been included in **Appendix D**.

Communications:

ROALD AMUNDSEN is fitted with a GMDSS Radio Station authorized for operation in areas A1, A2, A3 and A4. Further details can be found in **Appendix D**.

Navigation:

ROALD AMUNDSEN is fitted with state-of-the-art navigational equipment, particularly designed to perform in polar waters affected by sea ice. Details can be found in **Appendix D**.

Weather and Ice Information:

Particular care will be given to monitoring weather and ice conditions. Weather and ice information is obtained by the ship through government and private services by means of telex, fax, voice, Internet and e-mail communications. The ship subscribes to a private weather information service, which sends updated weather daily by e-mail providing current weather, sea conditions and forecasts for up to ten days. Additional ice information can be requested as well as a ship's routing service.

Safety:

ROALD AMUNDSEN is Polar Code Category B, Polar Ice Class PC-6. The vessel will seek to transit only open water and areas with very limited ice floes like those encountered in Alaska and Northern Europe and follow the route selected by the ice pilot. A highly-experienced Canadian Arctic experienced ice pilot/advisor has been added to the usual crew.

Emergency Capacity:

ROALD AMUNDSEN has life saving appliances for 1206 people. 480 guests and 151 crew (including 20 members of the expedition team plus the one contracted ice pilot) are expected for the voyage. 600 persons can be accommodated in 4 closed, motorized lifeboats. The ship can accommodate an additional 606 persons in 2 inflatable life rafts systems (Marine Evacuation System). This means the ship will enter Canadian Arctic waters with a large excess emergency capacity.

Medical facilities:

ROALD AMUNDSEN frequently operates in places which are up to three days traveling distance from land

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

support. Thus, the vessel is staffed and equipped to handle most medical emergencies. Stabilizing medical care is provided until patients can be safely disembarked to a land facility offering equal or superior care. Medical staff aboard the vessel for the duration of the cruise will consist of one Doctor and two Registered Nurses.

The ship has an intensive care unit equipped with cardiac monitor/defibrillator, lab capability, x-ray, a well-stocked Pharmacological unit, and several hospital beds. Emergency response capability and 24 hour on-call personnel are provided. The company has experience in arranging helicopter or fixed wing air ambulance transfers for critical patients.

Auxiliary boats for sightseeing and shore landings:

Auxiliary equipment/personnel aboard ROALD AMUNDSEN to support the expedition operation includes:

Auxiliary Boats (Explorer Boats):

- 15 Oxe 7.0 boats – each of capacity of 18 persons excluding driver
Manufacturer Oxe
- Engine type: Oxe Pro 150 HP (marine diesel oil)

The Explorer boats will be used to provide transport between ship and shore and small-group guided exploration of remote shores. Each is equipped with safety equipment and fuel-efficient engines that comply with all environmental protection standards and minimize noise, thereby mitigating impact to wildlife.

Safety equipment in Expedition Boats includes:

- First aid kit (prepacked and water tight)
- Emergency Kit (basic survival kit)
- Hand flares (3)
- Parachute rocket signal (1)
- Parachute anchor
- Basic tools for the engine
- Fire extinguisher
- Ropes and lines
- One towing line forward and one astern, ready for use
- Drift (or sea) anchor
- Paddle oar
- Navigation lights (fixed)
- Boatman's hook
- GPS
- VHF and UHF communications

Standard operating procedures are in place for the activity.

Kayaks:

Quantity: 12 double, 6 single

Equipment:

- Paddles x 46
- Dry suits: x 70
- Polar-Tec Fleece suit x 70
- Neoprene Shoes x 70
- Neoprene Gloves x 70
- Spray skirts x 13

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

- Tow lines x 3
- Safety equipment: Drift anchor, first aid kit, hypothermia kit, extra paddle, VHF radio, satellite phone, handheld GPS and extra base layer clothing for the paddler.

Operations will be conducted in small groups to be led by two kayak guides (in single kayaks) and support staff in a rescue boat (outfitted with safety equipment), which will accompany the groups at all times. Experience is required for single kayak, but no experience is required for double kayaks – that is open for all.

Safety equipment includes drift anchor, first aid kit, hypothermia kit, extra paddle, VHF radio, satellite phone, handheld GPS and extra base layer clothing for the paddler.

Kayakers are equipped with dry suits and fleece liner suits for warmth, neoprene 2-finger gloves/mittens, neoprene paddling shoes, paddling life jackets.

Standard operating procedures are in place for the activity. Participants sign a Medical and Legal Waiver and participate in an on-board safety briefing conducted by the kayak guides prior to being allowed to participate in the activity.

Life-saving equipment:

- Rescue boats (MOB) x2, 6 persons each, Palfinger type NDTs 3500H.
- Life boats x2, 150 persons each. Palfinger type MPC32.
- Tender life boats x2, 150 persons each. Palfinger type CTL38.
- Marine Evacuation System (MES) x2, 3x101 persons each. Viking type VEC+ 3A.
- Embarkation ladders x2. Length 16m each.

Additional information on SAR Arrangements, Emergency Response and Contingency Planning may be found in Section 6.n.

Advice from a variety of sources including, but not limited to, contacts at Federal agencies, community elders, the appropriate Hunters and Trappers Organizations/Associations/Committees (in Nunavut and the Northwest Territories), Environment & Climate Change Canada - Canadian Wildlife Service, Inuit Heritage Trust, and applicable government agencies in Nunavut and the Northwest Territories, among others, will be sought to seek advice in advance and look for ways to minimize impacts from this operation.

Auxiliary Tender Boats:

The tender boats will be used to provide transport between ship and shore and small group guided exploration of remote shores. Each is outfitted a trained driver and with safety equipment and a fuel-efficient diesel engine that comply with all environmental protection standards and minimize noise, thereby mitigating impact to wildlife.

Kayaks:

The kayaks are a mix of two- and one-person versions. Operations will be conducted in small groups to be led by two kayak guides (in a single kayaks) and support staff in a rescue auxiliary boat (outfitted with safety equipment), which will accompany participants at all times.

6.g. Environmental Practices

Hurtigruten has a long tradition of operating in both environmentally-sensitive areas and in waters in which ice conditions exist. Past sailings include Antarctica and substantial part of its operations have been in the

Norwegian Fiords, Svalbard, Greenland and Iceland. Operations in environmentally-sensitive areas have consistently demonstrated its commitment to strictly observing stringent standards and requirements for protection of the environment. To date, the company has conducted 185 trips to Antarctica and 37,000 trips to the Arctic.

The navigation team of ROALD AMUNDSEN will be accompanied at all times by a highly experienced Canadian ice pilot (ex. Canadian Coast Guard). The ice pilot will join in Pond Inlet and remain onboard until Nome, Alaska.

With the implementation of MARPOL Annex IV in 2006, Hurtigruten has scrupulously adhered to specific environmental criteria, including prohibitions on smoke emissions, burning of trash, ballast pumping, and sewage dumping and when feasible, has exceeded regulatory requirements.

In a continuous effort to monitor, verify and improve its operational standards, Safety, Security and Environmental audits are carried out yearly on all vessels in the Hurtigruten fleet. These audits are performed internally by company officers and externally by DNV GL to ensure compliance with company policies and national and international regulations.

6.h. Fuel and Hazardous Material Use

During the entire transit ROALD AMUNDSEN will not carry on board any heavy fuel oil.

Details of fuel use follows.

ROALD AMUNDSEN:

During the entire transit, ROALD AMUNDSEN will not carry on board any heavy fuel oil. ROALD AMUNDSEN uses light, low-sulphur marine diesel oil for fuel. The same fuel is used in the auxiliary Expedition boats. Total fuel capacity of ROALD AMUNDSEN is 550 m. tonnes. In addition, lubricating oils will be carried aboard the vessel for ship use.

AUXILIARY EQUIPMENT:

Auxiliary Boats (Expedition Boats):

Fuel type: Marine diesel oil.

Number of containers and capacity of containers:

- One tank on board each boat with a capacity of 50 litres.

Estimated Use (in Liters):

- To be determined.

Proposed storage methods:

- All fuel is stored in the main fuel tanks on the vessel. (Fuel is obtained by using a "straw" down into the main diesel/MGO tank of the ship.)

Fast Rigid Rescue Boats:

Fuel type: Marine diesel oil.

Number of containers and capacity of containers:

- One built-in container per boat. Capacity to be determined.

Estimated Use (in Liters):

- To be determined.

Proposed storage methods:

- All fuel is stored in the main fuel tanks on the vessel. (Fuel is obtained by using a “straw” down into the main MGO tank of the ship.)

In addition, lubricating oils will be carried aboard the vessel for ship use.

6.i. Waste Disposal and Treatment Methods

The proposed activity will result in wastes being generated during the course of normal ship operation.

Liquid wastes include:

- Domestic waste water (e.g. from cooking and cleaning activities),
- Sewage,
- Macerated food waste, and
- Oily Mixtures.

Solid wastes will also be generated, including:

- Garbage (e.g. waste paper, clean packaging materials, glass and wood from domestic and work activities on the vessel),
- Food waste (e.g. excess or spoiled food waste which is not suitable for maceration), and
- Hazardous or special waste (e.g. batteries, paints, oils, oily rags, etc., from maintenance or other work on the vessel).

Other sources of waste include ballast water and anti-fouling paint.

The program has been planned taking into consideration relevant provisions of MARPOL and the *Arctic Waters Pollution Prevention Act* (AWPPA) ([http://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 354/](http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._354/)). With the exception of grey and black water, all wastes will be retained on board for disposal outside of the Arctic to comply with Canadian legislation. Grey and black water will only be discharged well outside 12NM from shore, none while near communities, and both will have been treated by an EVAC MSP VIII-sewage treatment system prior to discharge. Additional information can be found in the Vessel Questionnaire included as **Appendix D**.

All hazardous wastes, including waste oil, will receive proper treatment and disposal at an approved facility. This meets with recommendations of Environment and Climate Change Canada.

Hurtigruten is aware of the Transportation of Dangerous Goods Act, 1992 <<https://www.tc.gc.ca/eng/tdg/act-amendedact-69.htm>> and Transportation of Dangerous Goods Regulations <https://www.tc.gc.ca/eng/tdg/safety-menu.htm> and that a waste manifest or the appropriate transportation of dangerous goods (TDG) documentation must accompany all potential hazardous samples and/or materials that are transported off site, if applicable. Further, the shipment of waste, if applicable, must be registered with the Government of Nunavut Department of Environment (GN-DoE).

An authorization or letter of conformation of disposal from the owner/operator of the landfill to be used for disposal of project-related wastes will be obtained.

Further information on waste disposal, including origins, assessment and minimization and mitigation may be found in Sections 15.c. and 15.g.

6.j. Spill Prevention Plan

Local and regional contamination of the marine and coastal environments and their dependent ecosystems could result as a direct effect of any spill. Historically it has been shown the overwhelming percentage of spills by volume comes from a few large spills by tankers offshore. Other than the large spills the majority of small ones occur while alongside a terminal and not while underway. Generally, the trend overall is clear, the average number of spills continues to decline. According to the International Tanker Owners Pollution Federation, who maintains statistics on this, in the ten years from 2002-2011 the number of spills was halved, continuing a trend from 1970.

Provided spill response procedures are followed, in the rare instance of a spill at sea the effects can be minimized. The most effective methods for minimization and mitigation are having a dedicated emergency contingency plan, ensuring strict adherence to established standard operating procedures, having an oil spill equipment on board, and effective containment procedures, spill contingency planning, and effective communications.

Oil spill prevention and response are given the highest degree of importance on Hurtigruten ships. Central to preventing oil spills is operating ships in accordance with the ships established procedures whenever the handling of oil or other hazardous substances are involved. The company's Safety Management System (hereafter SMS) addresses protection of the environment by requiring officer and crew compliance with specific standards and procedures necessary to ensure the safe management and operation of ships. As required by Annex I of MARPOL 73/78, an approved Shipboard Oil Pollution Emergency Plan (hereafter SOPEP) is in place on the vessel to contain and clean-up an incident involving release of fuel or oil.

Under the *Arctic Waters Pollution Prevention Act* (<http://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 354/>), penalties can apply for a vessel owner, and/or operator or individual crew member who are found guilty of illegally discharging oil in the Canadian Arctic. It is up to the court to determine the penalty for a specific conviction.

Sets of wet suits, boots and gloves are provided for crew involved in oil spill clean-up. Absorbent pads, plastic bags, saw dust, Aquabreak PX degreaser (low toxicity, non-caustic, multi-purpose, free from hydrocarbon solvents as well as biodegradable), shovels and chemical pump are carried on ROALD AMUNDSEN. Each calendar quarter, the ship performs oil and chemical spill response drills. Drills focus on containment, notification, clean-up and personnel safety requirements.

Some additional applicable SMS and SOPEP requirements include:

- All Deck Officers have attended Bridge Resource Management (BRM) training in accordance with requirements from Norwegian Maritime Authorities.
- Every three months, ROALD AMUNDSEN performs a fire/oil and chemical spill response drill as provided in the ship's SOPEP. Drills are supplemented with weekly safety training sessions; topics may include pollution response, response to spills of hazardous materials on board, oily bilge water management and personnel safety requirements.

6.k. Expedition Management

As noted in Section 6, the Expedition Leader is Mr. Tudor Morgan. He will be assisted by a highly-experienced expedition team. Lecture topics include Ornithology, Inuit Culture, Inuit Art, Botany, Geology, Climate Change, History and Exploration, Photography, Marine Mammals and other topics of interest to Natural History.

As mentioned previously, for the entire voyage we will be joined by Ms. Ashley Cummings from Pangnirtung, NU, who will serve as a cultural interpreter and guest lecturer.

The Expedition Leader is responsible for coordinating the expedition operations with the Captain and Chief Officer, including activities that will utilize the Explorer boats and kayaks. Assisting the Expedition Leader is the Member in Charge (Asst. Expedition Leader).

A list of expedition staff, including their biographical sketches, is included as **Appendix E**. As stated previously, the staffing was still being finalized at the time of document submission, so the list is current as of submission date. Changes may also occur once this document has been submitted. For a current list of staff, please contact the Company directly.

6.I. Operations Ashore in Communities

Community visits are being pre-arranged with contacts in each of the communities:

Nunavut:

Pond Inlet

Gjøa Haven

Cambridge Bay

Northwest Territories:

Ulukhaktok

The voyage has been planned with a high degree of sensitivity to the local communities in Nunavut and the Northwest Territories. Communities in both territories have been contacted and there is active and on-going communication between them and the company. Pond Inlet was visited in 2018 by MS FRAM. The goal is to provide a positive and enriching experience to all involved without disruption or negative impact or consequence. Every effort will be taken to ensure that the visits are low impact but of maximum benefit to the communities.

When in communities, guests will be divided into small groups (ca. 100 per group or less depending on community) so that there will be a guide-to-guest ratio of no less than 1:20 ashore at all times. Guides are provided by our local tour operator as well as by the Expedition Staff who will be on shore to provide assistance and support during the visit. Groups will be rotated throughout the day so that all guests who wish to go ashore have the opportunity to do so.

All activities are arranged with input from and approval by the communities. Guests will be fully briefed on how to behave with consideration for the communities, stay safe in Arctic conditions, and minimize disturbance to wildlife, historical sites and the environment before proceeding ashore. Activities will follow the guidelines laid out in the Government of Nunavut "Visitor Code of Conduct" and "Operator Code of Conduct," as provided by Cruise Nunavut, as well as the Association of Arctic Expedition Cruise Operators (AECO) Community Guidelines (<https://www.aeco.no/guidelines/community-guidelines/>).

Local Contacts include:

Nunavut:

Pond Inlet:

Passenger service agent:

Enookie Killiktee, Economic Development Officer

Summary of Shore-based Activities to be offered:

Hamlet tour and cultural performance.

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Gjøa Haven:

Passenger service agent:
Connie Baines, Economic Development Officer

Summary of Shore-based Activities to be offered: Details are being developed and finalized with the local community.

Cambridge Bay:

Passenger service agent:
Jim MacEachern, Economic Development Officer

Summary of Shore-based Activities to be offered: Details are being developed and finalized with the local community.

Northwest Territories:

Ulukhaktok:

Passenger service agent:
Laverna Klengenberg, The Honorable Mayor
Denise Okheena, Economic Development Officer
Tel: +1 867 396 8009

Summary of Shore-based Activities to be offered: Details are being developed and finalized with the local community.

The possibility of potential impacts will be minimized by strict adherence to any community guidelines in place, applicable laws and regulations, company policies and standard operating procedures; careful pre-trip planning and preparation, including obtaining in advance permits/authorizations (where applicable); briefings; advice received; as well as by implementation of mitigation measures and the supervision and monitoring of visitor activities in the field by experienced personnel. It is expected that the community visits will have an environmental impact that is not more than minor or transitory.

6.m. Expedition Activities Away From the Communities

In General:

At selected wilderness locations, guests will be able to participate in guided visits to sites of historic and wildlife interest and to view flora, geology, ice, and striking scenery. In some cases, off ship activities may include naturalist-guided walks or hikes for physical activity. Auxiliary boat tours and guided kayaking excursions without a shore landing are also planned.

In all cases, the Expedition Leader is responsible for coordinating and overseeing the off-ship activities and members of the expedition team will brief guests in advance about activities and appropriate dress, and in cases when a shore landing is made, the briefings will include information about behavior ashore, guidelines to follow and biosecurity measures (see below). Briefings may be augmented by maps, digital photography and sometimes video footage to further explain highlights, area(s) of operation, restrictions and landing conditions.

A distinguished team of lecturers and naturalists provides an in-depth educational program through an on-board series of presentations to enhance the guest's understanding and appreciation of the sites they will be visiting to inform guests in advance and to serve as guides ashore and to interpret on their area of expertise during auxiliary boat tours. Experienced expedition guides with expertise in the areas being visited will be sought.

Prior to guests going ashore, the Expedition Leader, Assistant Expedition Leader (who is also the "Member in Charge" of firearms and Lead Bear Guard) and the expedition staff (including the other Bear Guards) make a reconnaissance of the landing site, with the specific purpose of evaluating environmental and safety considerations.

Expedition activities will be conducted in a manner that do not interfere or disturb any Inuit or Inuvialuit harvesting activities, and in a manner so that no new trails or walking paths shall be created at any site that is visited.

Protective firearm usage for polar bear security will apply only to activities outside communities. The Company has developed a Polar Bear Safety Manual and online test, which is available upon request. (Additional information on Wildlife Protection may be found in Section 6.p.). Target practice and firearm usage training is arranged for all staff several times a year, as are special, in-depth training sessions lasting several days (next one for Arctic season 2019 will be held at Bergen, Norway in May 2019). Landings will be evacuated should polar or black bears or other predators be discovered in, or approaching, the landing areas. Auxiliary boating activities will be suspended if polar bears are in the water where activities are taking place. No camping or hunting will occur and no food other than emergency supplies will be taken ashore. Landings in wilderness areas will also follow the recommendations in the Association of Arctic Expedition Cruise Operators' Polar Bear Guidelines (<https://www.aeco.no/wildlife-guidelines/>) except that distances involving polar bears will follow the distances recommended by Government of Nunavut (ref. Section 6.p.). AECO has also developed guidelines or other wildlife which will be followed. These can also be found on the association's website at: <https://www.aeco.no/wildlife-guidelines/>. Guests will be briefed in advance, supervised in small groups while ashore and their activities closely monitored.

Archaeological and Historical Site Visits:

A Class 1 Archaeological Permit will be applied for with Government Nunavut's Department of Culture and Heritage. In addition to the visitor briefing video at the beginning of the voyage (mentioned previously in this section), the staff archaeologist - Dr. Lisa Rankin - will present a mandatory briefing to all guests on the protection of archaeological sites in Arctic Canada. The company (in collaboration with Dr. Rankin) has developed guidelines for visitors to archaeological and historical sites (ref. **Appendix F**) and will have these freely available to guests in hard copy and as a TV presentation available in all cabins and on displays around the ship. Her biographical sketch has been included in **Appendix E**.

As to site visitation protocols, guests will be briefed in advance about the next day's landings including information about terrain, cultural remains and where they are allowed to walk. Visitation to archaeological and historical sites will be limited a maximum of 100 guests, with only 25 guests at any one time being allowed to view the actual remains. Groups will be rotated throughout the landing.

Bear guards land first at the site, scouting the area and creating a safe perimeter. Before the guests are allowed at an archaeological or historical site, the staff archaeologist and other staff members survey the sites to identify site features, and evaluate any damage caused by weather, animals, or other visitors. As each tender boat arrives to shore, the staff at the landing site brief guests as to where they can walk and remind them not to pick up anything in the area as it could be related to the cultural site and not to wander outside the area protected by bear guards. Each group is accompanied by staff members as they walk around the site to "stations" near various features where the archaeologist, historian and other staff members can explain more about the historic relevance of the site. Groups will be overseen at all times by

expedition staff members, and after guests have left the site, staff members make sure that nothing has been left behind and that the site has been left as it was found, with the archaeologist leaving the site last with the bear guards.

Per regulations, no artifacts will be gathered at any of the sites.

Protected Area Visitation:

An application for a Migratory Bird Sanctuary Permit from Canadian Wildlife Service -- Environment & Climate Change Canada (CWS-E&CCC) has been requested for entry to Prince Leopold Island Migratory Bird Sanctuary. Plans are to view the bird cliffs from the vessel, auxiliary tender boats and kayaks. Interpretation will be provided by the Expedition Leader, ornithologists, and team of naturalists. Viewing will be from a respectable distance, without adverse impact. The vessel will not anchor while in the Sanctuary and no vessel discharges will be made. Noise, including from the vessel, will be kept to a minimum. No shore landings will be made. Strict adherence will be given to the CWS-ECCC Guidelines for Visiting Seabird Colonies in Canada, ECCC's Guidelines for Seabird Colony Viewing by Cruise Ships and the NOAA Whale Watching and Viewing Other Marine Mammals in Alaska guidelines.

Boat Tours:

Naturalist-interpreted sightseeing and wildlife watching tours will be offered when the Explorer tender boats are not being used for landing operations. These are a very good way to see the coast and wildlife with minimal physical activity and minimal impact to the environment. Norwegian Coast Guard approved flotation devices will be worn. Boat operators will have safety and recovery equipment and be in communication with the vessel throughout the operation. Standard operating procedures are in place and are available upon request.

Guided Kayak Excursions:

Guests will have been briefed aboard the vessel and pre-screened for the activity.

Kayaks will be deployed from ROALD AMUNDSEN's tender pit and towed to the launch area, which will likely be at the main landing area, although sometimes this is some distance from the main landing area (on shore) depending on topography. Kayaks can also be launched from a platform attached to one of the Expedition boats -- this is the case where there is no landing beach to take the kayaks ashore -- topography being steep cliffs or very rocky beaches.

The kayak party will prepare the kayaks prior to guest arrival. Kayak groups will be shuttled to the launch area by Expedition tender boats. Ashore participants will be briefed and given final instructions before launching from the beach.

Kayak groups will be guided by the kayak guides in single kayaks on excursions of about 1.5 hours paddling time. The kayak groups will be accompanied at a discreet distance by a safety boat, with recovery equipment and VHF radio communications with the kayak guides. Kayaks may land on suitable beach at the end of their tour or return to the original launch area. The group will be picked up and returned to the vessel. The next group will be brought from the ship and the procedure repeated. At the conclusion of the activity the kayaks and equipment will be returned to the vessel. Norwegian Coast Guard approved flotation devices will be worn. Standard operating procedures are in place and are available upon request.

Kayak guides and safety boat operators are briefed, as standard operating procedures, on the International Maritime Organization / Marine Safety Committee (IMO/MSC) "Guide to Cold Water Survival" for safety purposes:

<http://navigation.gl/media/gst/2550214/MSC1Circ1185GuideForColdWaterSurvivalSecretariat.pdf>. The

purpose of the guide is to examine the hazards of cold exposure that may endanger life and provide advice on how to prevent or minimize these dangers.

Biosecurity Measures (for wilderness shore landings):

The introduction of non-native plants from one landing site to another is a concern due to the potential transport of seeds via footwear and gear. This cruise will adhere to the Association of Arctic Expedition Cruise Operators (AECO) Biosecurity Guidelines (<https://www.aeco.no/guidelines/biosecurity-guidelines-2/>) by having guests and crew examine and clean clothes, footwear, and equipment thoroughly to remove seeds and organic matter before embarking on the cruise; and by thoroughly cleaning footwear, walking sticks or camera tripods with a disinfectant solution and using scrub brushes before disembarking and when returning to the ship from each wilderness landing. A boot washing station will be set up at the landing site as well as the disembarking embarkation point of the ship, to ensure all organic matter is removed between landings. (The disinfectant solution will also be used for dipping walking sticks and camera tripods.)

6.n. SAR Arrangements, Emergency Response and Contingency Planning

In General:

ROALD AMUNDSEN is a modern passenger cruise ship that is fully self-sufficient and meets all necessary requirements for an ocean-going ship. She has all valid international certificates issued by the country where the vessel is registered (Norway). The ship's components and machinery are built and maintained according to the standards required for the class of the vessel.

The vessel will be operated according to *The Canada Shipping Act, 2001* (CSA 2001) (<http://laws-lois.justice.gc.ca/eng/acts/c-10.15/>) and the *Arctic Waters Pollution Prevention Act* (<http://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 354/>) and their associated regulations established to provide minimum safety requirements and responsibilities that apply in all waters under Canadian jurisdiction, including Canadian Arctic waters.

Activities will be managed to be within the SAR and medical evacuation capability of ROALD AMUNDSEN'S resources. A detailed Emergency Response Plan to ensure appropriate contingency plans and sufficient arrangements for health and safety, search and rescue, and medical care and evacuation has been drawn-up and is in place for the proposed activity. This plan meets the requirements under the ISM Code, an international standard for the safe operation of ships and for pollution prevention. Chapter IX of the International Convention for the Safety of Life at Sea (SOLAS) requires compliance for the ISM Code. Under the Code, ships must have an established Safety Management System (SMS) in place. The ISM Code describes, in broad terms, what a ship operating company's safety management system needs to include. Other minimization and mitigation measures include IMO guidelines, AECO guidelines (discussed elsewhere) and standard operating procedures. These plans and arrangements are designed so as not to be reliant on support from other vessel operators or governments.

Hurtigruten recognizes that specific operations in the Arctic, such as ice and weather conditions can increase risk. Transport Canada's set of rules, including the Agency's "Guidelines for the Operation of Passenger Vessels in Canadian Arctic Waters – TP 13670 E" (last revision 02/2018) (<https://www.tc.gc.ca/media/documents/marinesafety/tp13670e.pdf>) have been consulted to support safe marine operations in Arctic conditions.

As a member of the Association of Arctic Expedition Cruise Operators (AECO), the Company provides details on its planned itinerary in advance of the season to the Secretariat for the association's Ship Scheduler. This advance ship coordination has greatly simplified the work of the Expedition Leaders on board the vessels in having to coordinate with each other on the spot and has minimized overlapping schedules and is an important minimization and mitigation tool to reduce potential environmental impact. The pre-season

schedules of the AECO fleet are generated by the Secretariat and circulated to all AECO member vessel and yacht operators. These pre-season schedules, along with other selected information, are circulated to MRCC's in the Arctic areas and selected others on the basis of a Memorandum of Understanding with AECO. Changes after the Scheduler closes are then the responsibility of the Expedition Leader to communicate to all other AECO vessels and yachts operating in the vicinity to ensure others are aware of the change(s) to avoid any conflict in landing (to ensure no more than one vessel is at a site at any one time).

Medical:

See previous description of medical facilities in Section 6.f.

Insurance:

Pursuant to the Package Tours Act, all organizers of package travels must provide security covering their obligation to refund monies paid and for the repatriation of the consumer in the event of the organizer's insolvency.

The security is normally given in the form of a bank guarantee, but the Fund may accept other adequate security.

According to the Norwegian Package Act a guarantee is required for three categories of travel arrangements:

1. "package travels"
2. "seat only"
3. Travel arrangements essentially similar to a package travel.

The Fund will cover all valid claims from customers if the security provided proves insufficient to cover the claims.

Wilderness and Polar Bear Safety:

Shore landings not in the immediate vicinity of a settlement have the potential to encounter a polar bear and perhaps other predators, including black and brown bears. Tender boat tours and kayak excursions have the potential to encounter polar bears in the water. All expedition excursions in Nunavut and the Northwest Territories outside of the communities will be accompanied by experienced polar expedition guides to ensure the safety of guests in these remote regions. In charge is the "Member in Charge" (the Assistant Expedition Leader). Staff members will follow established procedures in the Company's Polar Bear Safety Manual. Guides will be equipped with firearms and other non-lethal bear deterrents. Polar bear lookouts will be posted around landing areas at all times. The staff member in the Kayak Safety Boat will carry a firearm and bear deterrents in case of a swimming bear. Some boat tours may require firearms and bear deterrents to be carried on board the Expedition boats (in high risk areas with a lot of ice). Additional information can be found in Section 6.p. - Wildlife Protection.

Stranding Safety:

Due to the need to be prepared for the potential of weather conditions or drifting ice to temporarily interrupt expedition landing operations, meaning that guests may have an extended stay ashore, a stranding kit will be taken ashore on all landings in wilderness areas to provide emergency shelter and basic survival equipment.

Search and Rescue:

In the unlikely event that maritime response efforts are required, ROALD AMUNDSEN and Hurtigruten will work with the Canadian Coast Guard, the Department of National Defence and Transport Canada, for the coordination of maritime response efforts. It is noted that the Canadian Coast Guard has primary responsibility for coordinating maritime search and rescue operations.

6.o. Security Plan

The *Marine Transportation Security Regulations* (MTSR) (<http://lois-laws.justice.gc.ca/eng/regulations/SOR-2004-144/index.html>) provide a framework to detect security threats and take measures to prevent security incidents that could affect marine vessels and their facilities. These regulations apply even for isolated and unmanned stops for ROALD AMUNDSEN while in Canadian waters, including Nunavut and the Northwest Territories.

The Company's *Safety Plan*, under the *ISM Code* (<http://www.imo.org/en/OurWork/HumanElement/SafetyManagement/Pages/ISMCode.aspx>) includes procedures to be followed while the vessel is at anchor and while disembarking guests and includes an introduction, and covers corporate policies, safety management organization, and the safety management system (SMS). As not all aspects of the plan apply when the Vessel is in Canadian Arctic waters, the plan is only being briefly summarized.

Disembarking guests: The Officer of the Watch is responsible for all movements of guests. A deck officer will supervise each tender operation from the bridge wing. He/she informs the Captain of any boat launching, stowage, and "in/out" movements of guests, expedition team members and crew.

Guests will be checked prior to disembarking the vessel and any auxiliary craft to make certain they have donned their appropriate floatation device and that it is put on correctly in order that his/her movements cannot be hindered. A check will be made to ensure they are also dressed properly, have disinfected their footwear (and walking sticks and camera tripods) and have signed out according to the vessel's sign-in/sign-out procedures.

Deck crew will assist with the embarkation/disembarkation of the tender boats. Guests will be transferred into the boats using the wrist-to-wrist method.

A continuous communication's link with the Captain or watch officer on the bridge is in effect during all auxiliary boating operations and shore landings.

Accounts as to the numbers on board and ashore are provided to the Officer of the Watch as per standard operating procedures.

6.p. Wildlife Protection

As identified on the Voyage Plan (**Appendix A**), Route Map (**Appendix B**) and in Section 7.b., the size of the geographical area includes marine and coastal areas in the Qikiqtaaluk and Kitikmeot Regions of Nunavut and the Beaufort Delta Region of the Northwest Territories.

The proposed project will take place within habitats for various marine wildlife including fish populations, benthic invertebrates, and marine mammals, including *Species at Risk*. Additionally, land-based activities may also take place within habitats for many far-ranging wildlife species such as caribou, muskox, wolves, polar bears, wolverine, black and brown bears, migratory birds, and *Species at Risk*. The Species at Risk Public Registry can be found at: https://www.registrelep-sararegistry.gc.ca/search/SpeciesSearch_e.cfm.

As such, project activities may potentially affect both marine and terrestrial animal migratory patterns. Further information is provided in Section 15.e.

ROALD AMUNDSEN will make every effort to minimize underwater noise. Measures to limit noise include:

- Keeping ship speed no faster than required for safe navigation.
- Running at reasonably constant RPM.
- Limiting engine and machinery in operation to only what is required for safe passage.
- If necessary running on battery power for up to 30 minutes.

To avoid harmful interference with wildlife, standard operating procedures are in place. As well as firearms (30-06 rifles), bear guards always carry “cracker shells” (caliber 4) with them. These are fired from a compact pistol that staff wear while on duty ashore. Details are in the Company’s Polar Bear Safety Manual (available upon request). Staff serving as Bear Guards are all fully trained in the use of the cracker shell pistols and the rifles, and to add to the training Hurtigruten provides to staff already, the Company will be running a full training course for weapons, tender boat driving, etc., in Bergen, Norway, in May of this year for all staff working in the Arctic in 2019.

In normal circumstances the vessel will not ordinarily approach the expedition landing sites closer than 1500 feet (500 meters).

The ship and its personnel will further seek to avoid wildlife disturbance by:

- Keeping an extra bridge watch when in areas known for wildlife activity.
- Reducing ship speed anytime whales or concentrations of other wildlife are seen nearby.
- Adhering to the Association of Arctic Expedition Cruise Operators (AECO) Wildlife Guidelines when in proximity of wildlife, Government of Nunavut recommendations (below) and other guidelines as referenced previously.
- Advising crew and guests not to feed seabirds or other wildlife. This will be accomplished through in-cabin flyers, onboard announcements, lecture content, the Daily Program and through crew and guest education.
- Broadcasts through the outside public address system will be restricted and other distracting noises such as whistles and bells will not be used, except in emergency.
- On shore, guests will be informed not to disturb animals and birds. This includes avoiding making loud noises and keeping conversations low and calm. Group sizes will be kept to small numbers and with an appropriate guide-to-guest ratio to minimize impact. Groups will be rotated throughout the landing. Guests will be briefed ahead of time and advised to follow the instructions of the Expedition Leader and their guides.
- Polar bear safety will be paramount. Guests will be instructed that polar bears are potentially dangerous animals -- but also vulnerable -- and it is of the utmost importance that guests follow their guide’s instructions when in polar bear areas. (Additional information can be found in Section 15.e. Physical Disturbance.)
- Other species, besides polar bears, may pose a risk to human safety while participating in the planned activities including black and brown bears, wolves, muskox, walrus, fox and wolverine. These species represent a risk to people while conducting on the land activities. Guests will be informed of the risks that these species present, in addition to that of polar bears prior to landings ashore, in the onboard briefings by a member of the expedition team.
- Wildlife will not be harassed. This includes persistently worrying or chasing animals or disturbing large groups of animals. Hunting is prohibited. Sport fishing is prohibited without a sport fishing license. AECO (www.aeco.no) provides detailed guidance for Members on operating around wildlife: <https://www.aeco.no/wildlife-guidelines/>. These guidelines will be followed in most instances, except that for polar bears, Government Nunavut guidelines will be followed as the wildlife viewing distances are more restrictive.
- Hurtigruten has also prepared company-specific standard operating procedures for polar bears and other bears to provide guidance to expedition staff members who will be serving as guides in

the field. The manual is available upon request. Again, Government Nunavut guidelines will prevail where the GN guidelines are more restrictive.

Polar bears are a designated species of special concern under the Federal *Species at Risk Act* (<http://laws-lois.justice.gc.ca/eng/acts/s-15.3/>). Not only are polar bears an important component of Arctic marine and terrestrial ecosystems but they are also of commercial and cultural importance to the Inuit. They can also pose a safety risk to humans. All locations in Nunavut and the Northwest Territories, apart from community visits, including for natural, historic and archaeological expedition landings, have high potential for interactions with polar bears during the ice-free summer months when bears are forced on land and are in a fasting state because their prey are generally not very accessible. During this time, it is essential that the bears be disturbed as little as possible. Stress resulting from disturbance by human activities will increase the bear's energy requirements and potentially affect bear health and survivorship. Swimming bears are vulnerable as they cannot escape or defend themselves and will be stressed by boats. Females with cubs are especially vulnerable. If swimming bears are encountered, standard operating procedure is that the auxiliary boats should stop, move away, and allow the swimming bear(s) to proceed in the direction of their choosing. The activity may need to be suspended.

In Nunavut, reports of any problem wildlife or any interaction with carnivores must be reported to the closest local Government of Nunavut, Department of Environment Conservation Office -- Conservation Officer Pond Inlet Tel 867 899 8034 or Resolute Bay Tel 867 252 3879. In the Inuvialuit Settlement Region (ISR), there are potential compensation issues re wildlife kills. In the unlikely event that a bear must be shot in self-defense then the kill must be reported to a Renewable Resource Officer as soon as possible.

In addition to the above, Section 15.e. also discusses minimization and mitigation measures to avoid impact to wildlife.

6.q. Special Clothing and Equipment

Guests have been advised in pre-tour documentation that they will need to be properly outfitted for Arctic conditions with appropriate heavy, cold-weather clothing and expedition gear, including waterproof boots for the shore landings. Hurtigruten is providing each guest with a complimentary cold-weather wind- and water-resistant jacket. Additionally, each guest has been provided with a Packing Checklist of recommended gear along with advice in this regard. Guests will be reminded of the appropriate dress in onboard briefings and in the Daily Program, and in other written materials prior to expedition activities.

6.r. Traditional Knowledge - Inuit Qaujimajatuqangit

Inuit cultural beliefs and values are recognized and respected. Local residents will be engaged with regarding planned activities in the area when activities occur in inhabited areas and the Expedition Leader will solicit available Inuit Qaujimajatuqangit* to seek information about indigenous knowledge and guiding principles, as well as information about current recreational and traditional usage of the project area, which may inform project activities.

*Reference: *"Inuit Qaujimajatuqangit: The Role of Indigenous Knowledge in Supporting Wellness in Inuit Communities in Nunavut."* National Collaborating Centre for Aboriginal Health. 2009-2010. <http://www.nccah-ccnsa.ca/docs/fact%20sheets/child%20and%20youth/Inuit%20IQ%20EN%20web.pdf>

It is understood that the following are guiding Inuit Qaujimajatuqangit Principles**:

1. Respecting others, relationships and caring for people.
2. Fostering good spirit by being open, welcoming and inclusive.
3. Serving and providing for family and/or community.
4. Decision making through discussion and consensus.
5. Development of skills through observation, mentoring, practice and effort.

6. Working together for a common cause.
7. Being innovative and resourceful.
8. Respect and care for the land, animals and the environment.

**Reference: <http://www.nirb.ca/inuit-gaujimajatuqangit>

As stated previously, to assist further in this regard, Ms. Ashley Cummings of Pangnirtung, NU, is part of the Expedition Team as a Cultural Interpreter and guest lecturer. Ms. Cummings will join in Kangerlussuaq, Greenland until Nome Alaska. (Her biographical sketch has been included in **Appendix E**.)

As noted in Sections 4 and 6.1., community visits are planned. On-going consultations are taking place for the Company's planned visits in Nunavut and the Northwest Territories. Hurtigruten has solicited direct engagement with local residents through communication with the hamlet communities and with the local agents arranging services in advance and will continue to look for ways to encourage a dialog with potentially interested groups and individuals prior to undertaking project activities. The hiring will include local people in support of organized activities in the communities to be visited. In addition, arrangements have been made for carvings and other artifacts and handicrafts to be available for guests to purchase during community visits.

6.s. Giving Back to the Communities:

Cruise ship visits stimulate the tourism economies of the regions to be visited as well as benefiting the local economies. Positive impacts to local economies through community donations and the purchasing of services and artistic goods during community visits will ensure beneficial visits for all parties.

Hurtigruten has demonstrated a clear desire to commit funds to ensure that the local residents benefit from these proposed visits and that community economic benefits are realized. We know that all too often, ship guests spend the day in communities but leave very little financial impact. We are determined to ensure that doesn't happen. To that end, the company has agreed to actively promote the visits to guests ahead of arrival and encourage guests to purchase artifacts and handicrafts when in the communities. Where possible, guides and tour services will be pre-arranged to benefit as many as possible with organized shore excursions, cultural performances, tours, guiding and other tourism-related services. These services are being arranged based on collaborative engagement with the communities.

Groups taken ashore during organized community visits will be small in size and rotated during the visit so as not to overwhelm the hamlet communities and to minimize strain on local infrastructure and service/goods providers. Groups will be escorted by members of the Expedition Team, in conjunction with personnel from the hamlet communities, with services arranged by our appointed Passenger Service Agents (ref. Section 6.1.).

For community visits, Hurtigruten also follows the advice provided by AECO's Community Guidelines (<https://www.aeco.no/guidelines/community-guidelines/>) and guidance provided by Cruise Nunavut.

7. Developer's Commitments

Hurtigruten has a long tradition of operating in both environmentally sensitive areas and in waters in which ice conditions exist. Operations have consistently demonstrated the Company's commitment to strictly observing stringent standards and requirements for protection of the environment.

With their extensive field experience in conducting expedition operations, standard operating procedures and guidelines have been developed and operational plans set in place to ensure that shore activities from the planned development result in impacts that are not more than minor or transitory in nature. This

includes practices such as Biosecurity protocols; standard operating procedures for landings at wilderness sites; strict guide-to-guest ratios when making expedition landings; voluntarily restricting numbers ashore to small groups at wilderness, historical and archaeological sites; establishing procedures so that no trace of the visits are left behind and ensuring that nothing will be taken ashore apart from emergency supplies and that nothing will be left behind. Other measures include onboard briefings; printed materials provided in advance to brief guests, so they are dressed appropriately and know how to behave ashore; ensuring groups are escorted by a highly qualified team of field personnel; hiring adequate staff in order that guests are guided in small groups; providing polar bear and bear safety in bear areas and obtaining permits, licenses and authorizations in advance.

On the technical side of the operation, Hurtigruten has carefully considered the operation from all perspectives. Based on experience in-house, the operator has employed a vessel with the latest, state-of-the-art environmental practices (ref. Section 8) and suitable technologies to carry out the field operations. Operations will be in accordance with applicable legislation.

As noted in Section 6.r., consideration has also been given to *Inuit Qaujimajatuqangit*. This includes consideration of the voyage planning from the perspective of Indigenous people in order that activities do not interfere with traditional wildlife harvesting or land use activities.

Hurtigruten's special operations staff, at all levels, have extensive background and experience in applying specific measures to avoid negative environmental impacts. Highly experienced personnel are also in place aboard the vessel to fully support the planned operation.

For over 125 years since the company was founded, Hurtigruten's original goals of excellence have never been compromised and the company continuously looks for ways to improve and refine its product, both on board and in terms of destinations. A keen sense of never resting on accolades and laurels is an important element of the Company's philosophy, as is its commitment to delivering the finest experience in the expedition cruise industry. Testimony to this are the following recent awards the Company has received:

Name of prize/award	Country/market	Information
2019		
HSMAI Norway 2019, Social media - campaigns and activities	Norway	Also received an honorable mention in the award for Campaigns in the marketing awards.
Travvy Award for "Best Expedition Cruise Line" (Silver)	USA	Known as the Academy Award for the travel industry.
Grand Travel Awards 2019: Hurtigruten Svalbard - Årets Spesialarrangør (Specialist Travel Operator Award)	Norway	The Oscars of Norwegian Travel. Won this price second year in a row.
2018		
Travvy Award for "Best Expedition Cruise Line" (Silver)	USA	Known as the Academy Award for the travel industry.
Magellan Award Gold (by Travel Weekly) Best expedition cruise shore excursion	USA	Honors the best in travel and salutes the travel professionals behind it all.

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Grand Travel Awards 2018: Hurtigruten Svalbard - Årets Spesialarrangør (Specialist Travel Operator Award)	Norway	The Oscars of Norwegian Travel
Magellan Award Gold (by Travel Weekly) Best Overall Eco- Friendly "Green" Cruise Ship	USA	Honors the best in travel and salutes the travel professionals behind it all.
Magellan Award Silver (by Travel Weekly) Best Expedition Itinerary	USA	Honors the best in travel and salutes the travel professionals behind it all.
Germany's Travel "Brand of the Year 2018"	Germany	Category "tour operators & booking pages", 1st rank, awarded by business journal "Handelsblatt"
Highest Customer Loyalty	Germany	2nd rank within category "cruise operators", awarded by business magazine "Focus Money" in cooperation with Deutschland Test
Brand Champion (2nd), Product Champion (3rd), Price Champion (4th)	Germany	Nationwide daily newspaper "Die Welt" in cooperation with ServiceValue detected the "client enthusiasm" identifying the champions of the three topics "price", "product" and "brand"
Gullenken 2018, Hurtigruten Svalbard	Norway	Finalist "The best Facebook page of the year".
Tripadvisor, Hurtigruten Svalbard, Coal Miners Cabins	Norway	Coal Miners' Cabins got "Travellers Choice"
Telegraph Travel Awards 2018	UK	Best Large Cruise Line
British Travel Awards 2018	UK	BRONZE AWARD, Best Specialist Cruise Line (Ocean & Expedition)
Silver Travel Awards 2018	UK	Best Expedition Cruise Line
SPAA Awards 2018	UK	Best Specialist Cruise Line
Northern Ireland Travel Awards 2018	UK	Best Specialist Cruise Line
Travel Weekly Cool Cruises 2018	UK	Best for Exploration
Travel Weekly Cool Cruises 2018	UK	Best for On-board learning
Cruise Critic UK Editors Picks 2018	UK	Best for Adventure

Previous awards:

2017 US - Travvy (travAlliancemedi) - Best Cruise Line, Expeditions and Adventure
 2017 UK - The UK Cruise Critic -Best Cruise Line for Adventure
 2017 Norway - Grand Travel Award – Best Shipping Company in Norway
 2016 Travvy Award (travAlliancemedi) – Gold Award for Best Polar Expedition Operator
 2016 USA Today 10 Best Reader's Choice – Best Boutique Cruise Line
 2016 TravelAge West - Best Expedition Cruise Line (Western Agents' Vote of Excellence)
 2016 WAVE Award – Best Expedition Cruise Line

Hurtigruten's record demonstrates that it has the business management qualifications and experience to manage and operate a cruise ship business and to provide visitors to all destinations with a unique educational and vacation experience, consistent with what they believe should be made available to their guests.

8. Technology

Details on equipment have been provided in Section 6.f. The ROALD AMUNDSEN is the first of its kind- a hybrid expedition cruise ship. In this case “hybrid” means that ship is fitted with massive batteries that can store excess electrical energy for later use. The ship is capable of running on battery power alone for up to 30 minutes. The innovative ship design integrates an ice-strengthened hull and a wave piercing bow design. The onboard hybrid power solution in combination with the hull structure and efficient electric power systems will reduce the fuel consumption by approximately 20% and CO₂ discharges by 20%, which is equivalent to more than 3,000 metric tons of CO₂ a year.

9. Alternatives

Five alternatives have been considered, including:

- 1) Changes to itinerary,
- 2) Changes to number of guests,
- 3) Changes to vessel and auxiliary craft used,
- 4) Changes to activities,
- 5) Not proceeding with the cruise program.

Alternative 1: Changes to itinerary

Other sites could certainly be selected however there is perceived to be no benefit in doing so since these are not community visits.

Under these circumstances a change in the itinerary is therefore not considered necessary to minimize potential environmental impact.

Alternative 2: Changes to number of guests

A reduction in the total number of guests might reduce the absolute level of any impact, however, against this are weighed the factors of acceptable cost for guests and financial return for Hurtigruten, as well as the carrying capacity of the vessel.

During summer 2016 and 2017 one passenger vessel, MS CRYSTAL SERENITY, (operated by Crystal Cruises LLC) carried approximately 900-950 guests, 655 crew and an expedition staff team of 21 plus two Ice Pilots, conducted landings using expedition craft that were carried aboard an accompanying support vessel (RRS Ernest Shackleton) in Nunavut and the Northwest Territories (Ulukhaktok). Comparatively, ROALD AMUNDSEN is a mid-size expedition cruise ship. Carrying approximately 480 guests, 170 crew (including approx. 20 members of the expedition team) plus one contracted ice pilot. As such, her relatively small size enables her to meet the aim of not compromising environmental concerns. The Company believes she is therefore an appropriate vessel for this type of operation.

Limiting to small groups ashore (in groups not more than 100 at a site at one time, and less where small groups are required) for the expedition landings in wilderness areas provides a strong management tool to minimize and mitigate impact.

Crew numbers ashore will be limited. Crew will only be allowed ashore for leisure purposes during the expedition landings if they are required to assist the expedition team with the operations. Should this be the case, crew will be briefed; same as guests, and the Expedition Leader, Asst. Expedition Leader and the expedition team will also closely monitor their activities.

Under these circumstances a change in overall passenger numbers is therefore not considered necessary to minimize potential environmental impact.

Alternative 3: Changes to vessel and auxiliary craft used

ROALD AMUNDSEN is a modern ocean-going vessel with state-of-the-art technology, and experience amongst her officers and crew. As mentioned previously, the Canadian ice pilot (ex. Canadian Coast Guard) that will be in attendance to assist the navigation team has been specially selected for this voyage.

In addition to the onboard team, Hurtigruten's shore-side staff and shipboard personnel are comprised of highly-qualified individuals with extensive experience in the maritime industry operating in some of the most environmentally-sensitive waters around the world.

The vessel is professionally managed to meet and exceed Canadian and international shipping standards and is evaluated by an aggressive and comprehensive annual audit program that reflects and has previous experience in areas where ice is present. All current and relevant certificates are in hand and the vessel is maintained by suitably-qualified engineers and mechanics to meet requirements under the vessel's classification society.

A different vessel could be utilized but this could result in a vessel that is less suited and could result in a Master, bridge officers and/or crew with less suitable experience.

Due to the limited numbers of equally-suitable vessels, and contractual obligations, it is not feasible to make a change in vessel as decisions such as these require lengthy advance planning and cannot be made quickly or immediately. Considering the commercial/economic case for the proposed activity, there is no rationale for considering an alternative vessel.

There are alternative motorized craft that could be utilized for auxiliary boat operations; however, there would be no differences in the potential impacts resulting from this change. Oxe-brand Explorer boats outfitted with Oxe Pro-brand outboard engines have been standard equipment for many years of expedition tourist operations, including in Polar Regions, and have proven to be a safe and reliable means of transportation. Therefore, there is no basis for making any changes.

The alternative of not using sea kayaks also has no environmental or safety benefit should this activity not occur. These craft are an appropriate means of transportation for leisure activities; many expedition cruise operators have utilized kayaks for a number of years and the expedition team routinely offers kayaking aboard many other vessels around the world. The appropriate kind of kayaks have been selected for this particular activity and procedures are in place for a safe operation, along with qualified polar-experienced Kayak Guides and support staff who will be overseeing the activity. Therefore, there is no basis for making any changes.

Alternative 4 - Changes to Activities

The activities being offered are not new and have been offered in the Arctic (and elsewhere in the world) by a number of expedition cruise operators, including Hurtigruten, for many years now. Hurtigruten has established activities that are within their capabilities and plans to carry out the activities with specially selected personnel who have the appropriate experience to ensure the activities can be carried out safely, in an environmentally responsible manner, to Canadian legislation, to AECO standards, to the Company's expectations and with equipment suitable for the activity and area of operation. Many expedition team members have worked for Hurtigruten or other expedition cruise operators conducting the same activities in the Arctic and Antarctic and bring with them this additional experience.

Activities will be carried out with the appropriate supervision, with experienced personnel and with standard operational procedures and safety measures in place. These activities have been designed so as not to result in any risk to participants and in a manner in that they will have not more than a minor or transitory environmental impact. Therefore, there is no basis for making any changes.

Alternative 5 - Alternative of Not Proceeding with the Planned Cruise Program

The alternative of not proceeding with the cruise program is the only alternative that could remove all potential risks of environmental impact. Considering that there is local, national and international acceptance as to the legitimacy and benefits of the planned activity, provided that reasonable environmental standards have been considered and assessed to minimize any objective environmental risk, this alternative does not appear to be justified.

The activity as proposed will be carried out in accordance with Canadian legislation, applicable AECO guidelines and Company-specific standard operating procedures as well as advice received from the Nunavut Planning Committee, members of the Nunavut Impact Review Board, Environmental Impact Screening Committee, members of the Environmental Impact Review Board, Inuit Heritage Trust, Hunters and Trappers Organizations/Associations/Committees and from community input, among others. Taken together, these measures will provide the basis for ensuring that impacts from the activity, if any, will be not more than minor or transitory.

Any decision to cancel the planned cruise for anything less than the most compelling environmental reason would be contrary to the Company's purpose, which is to operate expedition cruises on a worldwide basis, including its planned voyage to Nunavut and the Northwest Territories.

10. Description of the Biophysical Environment – Ulukhaktok

(As requested by the EISC)

The following is excerpted from "Inuit vulnerability and adaptive capacity to climate change in Ulukhaktok, Northwest Territories, Canada" (Polar Record, page 1 of 21. Cambridge University Press, 2008. Tristan Pearce, et al.)

Ulukhaktok is a coastal Inuit community of approximately 430 people (96% Inuit) (NWT Statistics 2006) located on the west coast of Victoria Island (70°45' 42" N, 117°48' 20" W) in the Inuvialuit settlement region (ISR), NWT (Fig. 1). Victoria Island is the second largest island in the Canadian Arctic archipelago. The area around Ulukhaktok is characterised by lowlands, hills and rugged plateaux, and numerous ponds, lakes and rivers. The ISR was created in 1984 with the signing of the Inuvialuit final agreement (IFA), a land settlement agreement between six Inuit communities and the Canadian Government. 4 PEARCE, SMIT, DUERDEN, FORD, GOOSE, AND KATAOYAK Federal and territorial government agencies and Inuvialuit organisations jointly manage social, economic, political, and environmental issues in the ISR including education, health care, fish and wildlife management, and resource development (Fast and others 2001). Ulukhaktok evolved as a permanent settlement starting in 1939 with the establishment of a Hudson's Bay Company (HBC) trading post and a Roman Catholic mission near the location of the current settlement. Throughout the 1940s and 1950s, the regional population continued to live in isolated hunting and trapping camps and came to Ulukhaktok several times a year to trade furs and socialise. Inuit in Ulukhaktok are largely descended from the northernmost groups of Copper Inuit: the Kangiryuarmiut of Prince Albert Sound and the Kangiryuatjagmiut of Minto Inlet (Condon and others 1995). In the 1930s and 1940s, several western Inuit (now called Inuvialuit) from the Mackenzie Delta region moved into the Ulukhaktok area for the purposes of trapping or employment at the HBC or the Roman Catholic mission (Condon and others 1995). As a result of the closing of the Reid Island HBC trading

post on southern Victoria Island in the early 1960s, several Puvilingmiut families also moved to the Ulukhaktok area (Condon and others 1995). In 1967 the last family to remain on the land moved into the settlement and the settlement has since expanded considerably (Condon and others 1987). The present community is described as a 'modern Inuit town' (Stern 2001). There is a school from kindergarten to grade twelve, a satellite campus of Aurora College, a health care centre, arena, community hall, hotel and restaurant, artist print shop, two grocery stores, and a convenience store. Like many communities in the Canadian Arctic, bulk supplies are transported to the settlement annually by barge and weekly year round flights from Yellowknife and Inuvik provide much needed medical and health services, and are vital transportation links for mail, perishable foods, guests, and freight. Since the mid-1980s the settlement, rather than the land, has increasingly become the focus of daily life for many residents, and wage income is an important component of Ulukhaktok's economy. 25% of Inuit adults in Ulukhaktok between the ages of 18 and 64 years have full time wage employment, another 25% have regular part time jobs, and the remainder are either dependent on another wage earner or derive their income from subsistence earnings, seasonal employment (for example guiding and helping sport hunts, wildlife monitoring, mineral exploration), casual work or social transfer payments (Condon 1987; Stern 2001). Despite undergoing sweeping social, political and economic changes, subsistence hunting, fishing and trapping continue to be valued activities among Inuit in Ulukhaktok. 76% of community members participate in hunting and fishing and country foods (locally harvested fish and wildlife) are the primary source of meat for 46% of households (NWT Statistics 2006). Arctic char, iqualupik (*Salvelinus alpinus*), ringed seal, natiq (*Phoca hispida*), bearded seal, ugyuk (*Eringnathus barbatus*), lake trout, ihuuhuk (*Salvelinus namaycush*), Peary caribou, tuktu (*Rangifer tarandus*), Dolphin-Union caribou, tuktu (*Rangifer tarandus groenlandicus* x pearyi), muskox, umingmuk (*Ovibos moschatus*), King Eider ducks, kingalik (*Somateria spectabilis*), and snow geese, kanguq (*Chen caerulescens*) are common species that are hunted for subsistence. Although to a much lesser extent than in the past, Arctic fox, tirigannia (*Vulpes lagopus*) and Arctic wolf, amaruq (*Canis lupus arctos*) are trapped for their pelts that are sold at southern auctions. Participation in harvesting varies among community members with some people continuing to hunt full time and others balancing hunting with wage employment. Condon and others (1995) and Collings and others (1998) documented several interconnected variables influencing individual participation in subsistence harvesting in Ulukhaktok including age, employment, family histories, motivation, skill and knowledge levels, access to capital equipment, and availability of time. Climate change is but one of several factors affecting involvement in harvesting activities and is considered as such in this analysis of vulnerability.

11. Traditional and Other Land Uses / Potentially-Affected Communities

The area of operation has been identified in Section 7.b. Project Location.

It is noted that subsistence hunting, fishing, and trapping continue to be valued activities and that there are Territorial *Species at Risk* within Nunavut (<https://www.gov.nu.ca/environment/documents/species-risk-act-registry>) and the Northwest Territories (http://www.nwtspeciesatrisk.ca/sites/default/files/speciesatriskinthenwt_english.pdf).

The community visits of ROALD AMUNDSEN are being planned in consultation with the Economic Development Officers in Nunavut and Northwest Territories so there should be no interference or jeopardy to the aims of any community conservation plans, nor any known land uses for the hamlets and/or municipalities.

The Expedition Leader will inform all who are going ashore of any designated Species at Risk in the areas to be visited.

The planned visit of ROALD AMUNDSEN to Ulukhaktok is not expected to interfere or jeopardize the aims of the Olokhatomit Community Conservation Plan nor any known land uses for the municipality.

ROALD AMUNDSEN plans to land guests at Smoking Hills, which is Inuvialuit Owned Land. Permission will be sought.

12. Community, Co-Management, Inuvialuit Organizations and Government Engagement and Consultation

Notification of the vessel's itinerary has been distributed to, or will be distributed, during the Review Board procedures or permit application processes (as applicable) by the following government departments and organizations, associations:

- Canada Border Services Agency
- Transport Canada
- Environment & Climate Change Canada - Canadian Wildlife Service
 - Note: The ECCC-CWS Recommendation Form will be sent to the communities of Resolute and Pond Inlet (as being the closest communities to Prince Leopold Island Migratory Bird Sanctuary)
- Canadian Coast Guard
- Department of Fisheries and Oceans (see also NWT below)
- Shipping Federation of Canada
- Citizenship and Immigration Canada

Nunavut:

- Government of Nunavut
 - Department of Economic Development & Transportation (Cruise Nunavut)
 - Department of Culture & Heritage
 - Department of Environment
- Nunavut Planning Commission
- Nunavut Impact Review Board
- Nunavut Tourism
- Inuit Heritage Trust
- Qikiqtani Inuit Association
- Kitikmeot Inuit Association [Note: no KIA-owned lands are being visited during summer 2019]
- Economic Development Officers for Pond Inlet, Gjøa Haven and Cambridge Bay
- Hunters & Trappers Organizations for Pond Inlet (Mittimatalik HTO), Gjøa Haven (Gjøa Haven HTO) and Cambridge Bay (Ekaluktutiak HTO)

Northwest Territories:

- Government of Northwest Territories
- Economic Development Officer for Ulukhaktok
- Environmental Impact Screening Committee / Environmental Impact Review Board
- Fisheries Joint Management Committee
- Department of Fisheries and Oceans (for access to Anguniaqvia niqiqyuam Marine Protected Area)
- Inuvialuit Land Administration
- Olokhatomit Hunters and Trappers Committee

Community visits are planned and it is understood that community consultation, by way of the NIRB and EIRB public review processes, will avoid potential negative impacts to public and traditional land use activities along the proposed travel route, particularly in areas adjacent to the sites to be visited, from vessel

and tourism activities since it is likely that the terrestrial and marine areas near these communities would be used for traditional activities and noise from vessel and auxiliary boat operations may temporarily change distribution of harvested species through avoidance and may affect personal enjoyment of the land and marine areas. Community consultation is desired to ensure that the project does not interfere with Inuit wildlife harvesting or traditional land use activities in the project area. Community Economic Development Officers (as noted above) will be contacted well in advance of the summer season with details provided in the Project Description and by letters of introduction sent under separate cover.

13. Analysis of Potential Significant Negative Environmental Impacts

The proposed area of operation has been stated in Section 6.b.

ROALD AMUNDSEN will be transiting through offshore/marine environments with wildlife habitats featuring a range of wildlife, including Species at Risk in Nunavut <<https://www.gov.nu.ca/environment/documents/species-risk-act-registry>> and Northwest Territories <<https://www.nwt-species-at-risk.ca/CMA/SarList>>. Additional information regarding Species at Risk within the Northwest Territories (2014) has been identified in the following reference: http://www.nwt-species-at-risk.ca/sites/default/files/pdf/SpeciesatRiskintheNWT_English.pdf.

Hurtigruten is aware of the *Nunavut Species at Risk Act*:

<ftp://ftp.nirb.ca/01-SCREENINGS/COMPLETED%20SCREENINGS/2013/09DN018-DND-Nanisivik%20Naval%20Facility/04-AUTHORIZATION/141201-09DN018-SARA-IA1E.pdf>

A list of wildlife species anticipated to be encountered has been included in Section 15.e.

ROALD AMUNDSEN will be transiting through offshore/marine environments with wildlife habitats featuring Species at Risk in both Nunavut and the Northwest Territories. SARA species most likely to be encountered include Atlantic Walrus (Special Concern – pending), Beluga Whale (Special Concern – pending), Bowhead Whale (Threatened/Special Concern – Pending), Grey Whale (Special Concern), Polar Bear (Special Concern), Killer Whale (Special Concern – Pending) and Narwhal (Special Concern - Pending). Other SARA species at risk that could be encountered include: Eskimo Curlew, Ivory Gull, Ross's Gull, Harlequin Duck, Rusty Blackbird, Felt-leaf Willow, Peregrine Falcon, Short-eared Owl, Peary Caribou, Barren-ground Caribou, Red knot, Porsild's Bryum, Horned Grebe, Grizzly Bear and Wolverine.

During expedition landings, guests, the expedition team, and crew assisting will be landing ashore in areas where wildlife and delicate tundra flora and vegetation may be encountered. The proposed activity could be indirectly disruptive to certain animal and plant species.

Historically- and culturally-significant sites will be visited with a Class 1 Archaeological Permit being requested through Government of Nunavut's Department of Culture and Heritage. Management protocols are in place to protect the sites during organized landing activities. Details have been included in Section 6.m.

A permit to visit the Prince Leopold Island Migratory Bird Sanctuary and Cape Parry Migratory Bird Sanctuary is being sought from Canadian Wildlife Service -- Environment & Climate Change Canada.

Management protocols are in place to protect sites during organized marine-based activities. Details have been included in Section 6.m.

Section 14 includes the cumulative environmental impacts anticipated; Section 15 an assessment of the proposed activity, including the minimization and mitigation of likely environmental impacts.

As “Northwest Passage - In the Footsteps of Roald Amundsen, Kangerlussuaq to Nome, 20 August - 11 September 2019 (Voyage AMNWP1911)” project is a proposed cruise tourism project, the nature of potential impacts is considered to be well-known, with potential for infrequent, localized impacts to the biophysical environment that are temporary in nature, reversible and mitigable with due care.

14. Cumulative Environmental Impacts

Cumulative impact can be defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.”¹

Examples of cumulative impacts to which the proposed activity may contribute include:

- Effect on tundra vegetation or periglacial features through additive effects of pedestrian traffic,
- Increased pedestrian traffic,
- Disturbance of migratory and/or At Risk Species,
- Degradation of cultural and historic artifacts from handling, abrasion, theft, etc.,
- Changes in attitudes over time and hence acceptable uses of localities through familiarity and precedent,
- Effects to marine and terrestrial wildlife and historical sites.

Hurtigruten has planned the proposed project to visit expedition landing sites that are in close proximity of those being visited by other expedition cruise operators; however, limited baseline environmental monitoring data exists for the sites that will be visited by ROALD AMUNDSEN, so it is difficult to judge the likely long-term cumulative effects of the visitation. As stated previously, the activity as planned has been designed to have an environmental impact that is not more than minor or transitory.

15. Likely Environmental Impacts: Assessment, Minimization and Mitigation of Proposed Activities

Potential negative impacts can be mitigated by adhering to the applicable Acts and Regulations, which must be observed by tourism operators conducting activities in the Canadian Arctic.

A list of relevant acts and regulations can be found in the Appendix to the *Guidelines for Passenger Vessels Operating in the Canadian Arctic – TPO13670E*, from Transport Canada, available at:

<https://www.tc.gc.ca/eng/marinesafety/guidelines-passenger-vessels-operating-canadian-arctic-tp13670e.html>.

At the time of document submission, the list included the following:

¹ Council on Environmental Quality. 1997. Considering Cumulative Effects under the National Environmental Policy Act. Washington, USA.

MS Roald Amundsen Hurtigruten Cruise AS Northwest Passage

A current list of all Canadian Acts and Regulations can be found on the Department of Justice Canada [website](#).

Federal Acts and Regulations	Department
<i>Canada Shipping Act, 2001</i>	Transport Canada & Canadian Coast Guard
<i>Arctic Waters Pollution Prevention Act</i>	Transport Canada
<i>Marine Liability Act</i>	Transport Canada
<i>Marine Transportation Security Act</i>	Transport Canada
<i>Canadian Environmental Protection Act</i>	Environment and Climate Change Canada
<i>Coasting Trading Act</i>	Canada Border Services Agency, Transport Canada
<i>Canada National Parks Act</i>	Parks Canada
<i>Oceans Act</i>	Department of Fisheries and Oceans
<i>Fisheries Act</i>	Department of Fisheries and Oceans
<i>Migratory Birds Contraventions Act</i>	Department of Fisheries and Oceans
<i>Species at Risk Act</i>	Environment and Climate Change Canada
<i>Arctic Shipping Safety and Pollution Prevention Regulations</i>	Transport Canada
<i>Charts and Nautical Publications Regulations, 1995</i>	Transport Canada
<i>Shipping Safety Control Zone Orders</i>	Transport Canada
<i>Anchorage Regulations</i>	Transport Canada
<i>Collision Regulations</i>	Transport Canada
<i>Navigation Safety Regulations</i>	Transport Canada
<i>Life Saving Equipment Regulations</i>	Transport Canada
<i>Marine Personnel Regulations</i>	Transport Canada
<i>Northern Canada Vessel Traffic Services Zone Regulations</i>	Transport Canada
<i>Steering Appliances and Equipment Regulations</i>	Transport Canada
<i>Ballast Water Control and Management Regulations</i>	Transport Canada
<i>Voyage Data Recorder Regulations</i>	Transport Canada
<i>Tarum Niryutait Marine Protected Areas Regulations</i>	Parks Canada
<i>Marine Mammal Regulations</i>	Department of Fisheries and Oceans

Nunavut Acts and Regulations:

- *Nunavut Act*
- *Nunavut Waters and Nunavut Surface Rights Tribunal Act*
- *Nunavut Planning and Project Assessment Act*
- *Tourism Act*
- *Outfitter Regulations*
- *Wildlife Act*
- *Nunavut Archaeological and Paleontological Sites Regulations*
- *Territorial Parks Act*
- *Territorial Parks Regulation*
- *Environmental Protection Act*

Northwest Territories Acts and Regulations:

- *Business Act*
- *Tourism Act*
- *Public Health Act*
- *Wildlife Act*
- *Forest Protection Act*

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

- *Fisheries Act (Canada)*
- *Historic Sites and Monuments Act*
- *Migratory Birds Convention Act*
- *Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act*
- *NWT Archaeological Sites Regulations (Canada)*

15.a. Emissions to Air

Origins:

Emissions to air generated by fuel burned during the proposed activity will originate from:

- Ship cruising, and
- Small auxiliary boats.

In addition, fueling activities or fuel spills could result in a small amount of fugitive emissions to be released. The incineration of waste will also result in emissions. These emissions contribute both directly and indirectly to the greenhouse effect and to local and regional air pollution.

There is potential for impacts in the region to be visited. The probability of impacts occurring is considered to be low, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence due to the intermittent nature of the proposed tourism activity and reversible in nature.

Assessment:

Emissions resulting from marine combustion are typically close to the source and well away from land. This is usually an environment where wind is a common feature. Emissions will generally be rapidly dispersed by wind, however any activity producing atmospheric emissions will contribute to regional and global air pollution burdens.

Minimization and Mitigation:

Careful, thorough and routine maintenance is the primary method for minimizing emissions of carbon oxides, unburned hydrocarbon and black smoke. Partial mitigation is possible through the use of 'clean' fuels and lubricants, and regular care and maintenance of engines. Hurtigruten is continually investigating new technologies and methods to increase the level of safety associated with its operations.

Hurtigruten has reviewed Environment and Climate Change Canada's "Technical Document for Batch Waste Incineration" (<http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=F53EDE13-1>), which provides information on appropriate incineration technologies, best management and operational practices, monitoring and reporting.

All combustible wastes will be incinerated daily, or as per Canadian legislation, with the ash removed from incineration activities and non-combustible wastes from the vessel to an approved facility for disposal. The incineration of combustible wastes will comply with the *Canada-Wide Standards for Dioxins and Furans* (http://www.ccme.ca/files/Resources/air/dioxins_furans/waste_incinerators_coastal_pulp/d_and_f_standard_e.pdf) and the *Canada-Wide Standards for Mercury* (http://www.ccme.ca/files/Resources/air/mercury/mercury_emis_std_e1.pdf). Measures will be taken so that no waste oil/grease will be incinerated onboard ROALD AMUNDSEN.

15.b. Emissions to Water – Fuel and Oil Spills

Origins:

Emissions to water will originate from:

- Ship cruising, and
- Small auxiliary boats.

There is potential for impacts to marine and coastal areas in the region to be visited. The probability of impacts occurring is considered to be low, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence due to the intermittent nature of the proposed tourism activity and reversible in nature.

Maintenance and fueling of auxiliary boats and by leakage from fuel containers may result in fuel and oil spills. A catastrophic loss from a vessel may result in an emergency fuel jettison however this is an unlikely scenario.

Standard operating procedure calls for refueling of the auxiliary craft to be done aboard ROALD AMUNDSEN and not in the auxiliary boats (e.g. on the water).

Local and regional contamination of the marine and coastal environments and their dependent ecosystems could result as a direct effect of any spill.

Assessment:

Fuel spills are most likely to occur due to fueling of the gasoline tanks for the auxiliary boats. Should a spill occur aboard the vessel, it is estimated a spill would be <10 liters.

ROALD AMUNDSEN will follow the route selected by the ice pilot. Because of this, the likelihood of a catastrophic puncture of a fuel tank with a loss of 1000 liters or more of fuel is extremely low.

Fuel spills rapidly evaporate however the rate of evaporation depends upon the conditions (e.g. polar or tropical), for example since at low temperatures evaporation is less complete.² In addition, as a number of hydrocarbons are highly soluble in water, their effect depends upon dilution.³

Minimization and Mitigation:

Fuel spills constitute the most unpredictable accident aboard ship; however, occurrence can be minimized through strict adherence to sound operating procedures, including a Spill Prevention Plan and employing operational measures throughout project operations.

Provided spill procedures are followed according to established operating procedures, spills occurring on the ship during fueling operations will be contained. The resultant spill from three fully-loaded tanks of fuel (50 liters each) in an inflatable boat during a catastrophic event could be in the order of 150 liters however this would be an extremely rare occurrence.

For fuels and chemical storage: Drip pans or other equivalent device shall be used when refueling equipment. In addition, secondary containment or a surface liner (e.g., self-supporting insta-berms and

² OSRL. 1998. Antarctic oil pollution course: 20-12 August 1998. Southampton, Oil Spill Response Ltd [published course handbook].

³ Cripps, G.S. and J. Shears. 1997. The fate in the marine environment of a minor diesel fuel from an Antarctic research station. Environmental Monitoring and Assessment, 46, 221-232.

fold-a-tanks) shall be used at refueling stations. Appropriate spill response equipment and clean-up materials (e.g., shovels, pumps, barrels, drip pans, and absorbents) will be readily available during any transfer of fuel or hazardous substances at all fuel storage sites and maintenance areas. Additionally, all personnel will be properly trained in fuel and hazardous waste handling procedures, as well as spill response procedures. All spills of fuel or other deleterious materials of any amount will be reported to the 24-hour Spill Line at (867) 920-8130.

The most effective methods for minimization and mitigation are contracting a highly experienced ice pilot with extensive experience in the region, having a dedicated emergency contingency plan, ensuring strict adherence to established operating procedures, having an oil spill kit on board, effective containment procedures, spill contingency planning, and effective communications. Spill prevention procedures include, but are not limited to, following established fuel bunkering procedures during bunkering operations, the use of funnels, spill mats during fueling and engine maintenance, use of drip trays; and utilizing absorbents.

15.c. Wastes Generated During the Expedition

Origins:

Wastes will or could originate from:

- Ship, and
- Small auxiliary boats

The proposed activity will result in wastes being generated during the course of normal ship operation.

There is potential for impacts to marine and coastal areas in the region to be visited. The probability of impacts occurring is considered to be low, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence due to the intermittent nature of the proposed tourism activity and reversible in nature.

Assessment:

Waste materials from ship operations include refuse, waste fluids from mechanics and sewage waste. Burnable wastes will be incinerated if required; with the resultant incinerator ash disposed of in an appropriate manner.

Relevant disposal routes are shown below.

Types of waste generated and proposed disposal routes:

<i>Waste Type</i>	<i>Route</i>
Non-hazardous	
Paper, plastics, timber	Separated and incinerated or removed for recycling and disposal. No plastic is incinerated.
Metal, glass	Separated or removed for recycling and disposal
Incinerator ash	Disposed of as per Canadian legislation
Biodegradable	
Food waste	Food will be segregated and refrigerated for disposal at certified reception port or grained and disposed according to MARPOL regulations
Human waste	Treated on board and disposed as per Canadian legislation
Gray water	To be disposed as per Canadian legislation

Hazardous	
Batteries	Separated and removed for recycling or disposal at certified reception port
Medical and sanitary waste	Frozen and removed for disposal at certified reception port
Fuels and oils	Removed for disposal at certified reception port

ROALD AMUNDSEN has TBT-FREE SPC anti-fouling paint on its hull. Organotin biocides are not contained in the particular brand of anti-fouling paints thereby complying with the IMO Antifouling Systems Convention (AFS/CONF/26).

Ballast exchange will be in accordance with Ballast Water Control and Management Regulations [<https://www.tc.gc.ca/eng/marinesafety/tp-tp13617-menu-2138.htm>] and the voluntary Ballast Water Exchange Guidelines [<https://www.tc.gc.ca/eng/marinesafety/tp-tp13617-schedule2-999.htm#c37c>].

Minimization and Mitigation:

All waste will be disposed of according to the procedures previously stated. Waste release incidents will be avoided according to adherence with standard operating procedures. The vessel will not deposit, nor permit the deposit of any fuel, chemicals, wastes (including waste water) or sediment into any marine waters and shall manage wastes on board the vessel prior to final disposal at approved port facilities.

Appropriate protocols are in place to minimize accidental releases or discharges that do occur and mitigated by clean-up efforts. Natural dispersion – through wave and wind action – will also assist with clean-up efforts should a waste release incident occur. Therefore, accidental discharge of these waste products into the environment will have no more than minor or transitory impacts.

While unlikely, the potential of an accidental discharge of fuel and waste products from a marine collision or other event does exist. Impacts to the environment from such events could include the accidental discharge of refuse or accidental release of petroleum fuel, in addition to small quantities of lubricating fluids, oils, and diesel fuel for the auxiliary boats.

For the auxiliary boat operations, standard operating procedures dictate that waste products, if any (for example as a result of an unexpected stranding ashore), are to be contained on board the auxiliary boats – not only while underway, but also when ashore. Any waste products and refuse will be returned to the ship for disposal in accordance with discharge parameters in accordance with Canadian legislation. Waste mechanical fluids will not be disposed of while the auxiliary boats are being utilized for landings or excursion purposes.

Emergency food rations are contained in the Emergency Shore Kit to be used in the event that a stranding occurs on shore. Should these rations be used, any garbage resulting will be collected using garbage/waste bags and returned to the ship for proper disposal. Any refuse will be returned to ROALD AMUNDSEN for disposal in accordance with discharge parameters as required by Canadian legislation.

15.d. Noise

Origins:

Noise will be generated by:

- Ship operations, and
- Small auxiliary boat operations

There is potential for impacts to marine and wildlife in the region to be visited. The probability of impacts occurring is considered to be low, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence due to the intermittent nature of the proposed tourism activity and reversible in nature.

Assessment:

Effect of noise upon wildlife and wilderness and aesthetic values is a key concern. Wildlife can be impacted by noise in two ways: 1) increased stress leading to changes in an individual's behavior and 2) disturbance of whole communities leading to breeding mortality. Species that could be disturbed include whales, seals, walrus, polar bear, seabirds and birds, including Species at Risk in Nunavut and the Northwest Territories with disturbance occurring on shore at the colony, nest or haul-out site during breeding, where impact could be the greatest. Other effects of noise can impact species that are resting; in cases such as this, the impact is likely to be less significant.

The level of noise disturbance is related to the number of auxiliary boats used, their movements, speeds, and whether or not the equipment is maintained in optimal conditions. Noise is caused by a combination of engine operation and engine speeds. Defective exhaust systems or other faulty equipment can also result in greater noise.

Minimization and Mitigation:

Impacts of noise effect from vessels and small auxiliary boats have been poorly studied. To minimize and mitigate impact, activities will be managed in accordance with:

- Environment Canada's Guidelines to Avoid Disturbance to Seabird and Waterbird Colonies in Canada (<https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=E3167D46-1>)
- AECO Guidelines for Expedition Cruise Operations in the Arctic (<http://www.aeco.no/guidelines/operational-guidelines/>)
- AECO Guidelines for Visitors to the Arctic (<http://www.aeco.no/guidelines/visitor-guidelines/>)
- Government Nunavut "Operator Code of Conduct" (available from Cruise Nunavut)

Diesel engines will be used on the auxiliary boats to minimize noise and emissions. Drivers are experienced in operating craft around wildlife and will ensure that boat operations are conducted in a way that minimizes disturbance to any wildlife encountered.

15.e. Physical Disturbance

Origins:

Physical disturbance may result from the following activities:

- Vessel operations,
- Small auxiliary boat operations, and
- Shore landings

There is potential for impacts to marine and terrestrial wildlife, and the terrestrial environment, including sites of cultural, historical, paleontological and geological importance. The probability of impacts occurring is considered to be low, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence due to the intermittent nature of the proposed tourism activity and reversible in nature.

Assessment:

Likely physical disturbance from ROALD AMUNDSEN and related small auxiliary boat operations includes activities such as water turbulence from vessel passage, the breaking of sea ice, damage to sea floor, deep-water corals and benthic communities from anchoring, and effect on wilderness and aesthetic values. The itinerary design will likely result in the vessel not being at anchor for more than one to two days and in regularly used anchorages. The vessel has a dynamic positioning system, which may be used as an alternative to anchoring.

The ship will stop sufficiently far from any wildlife colonies or open water access area in order that its physical presence should have no effect or impact on their behavior. A transitory effect on the wilderness and aesthetic values of the area will therefore result from the vessel's presence.

The geographic area includes marine and coastal areas. The proposed project would also take place within habitats for various marine wildlife including fish populations, benthic invertebrates, and marine mammals, including Species at Risk. Additionally, land-based activities may also take place within habitats for many far-ranging wildlife species such as caribou, muskox, wolves, polar bears, wolverine, black and brown bears, migratory birds, and other Species at Risk. As such, project activities may potentially affect both marine and terrestrial animal migratory patterns.

The timing of the project activity and the specific region the Operator intends to traverse for tourism activities are known polar bear summer habitats. The area also has been identified as having value and priority to the local communities for:

- i. Marine mammals including various whale species, walrus and seals;
- ii. Shoreline ecosystems;
- iii. Fish species including arctic char;
- iv. Drinking water;
- v. Terrestrial wildlife including caribou, muskox, wolves and grizzly bears;
- vi. Migratory birds including duck species and geese; and
- vii. Polar bears.

The proposed project activity could also interact with historically and culturally significant areas for traditional activities, such as hunting and fishing, while touring areas adjacent to the communities to be visited.

Landing, shore operations can adversely impact flora and fauna – including native, rare and endangered (e.g. Species at Risk) wildlife and sites of historical, cultural, archaeological, paleontological and geological significance. Boat beaching, pedestrian traffic, and physical contact can also adversely impact land, air and water quality, and historic and geologic features. Notably landing and shore operations may adversely impact on polar bears, nesting birds, hauled out seals or walrus, and on the intertidal marine ecosystem. Habitat destruction may be impacted due to trampling of nesting sites and fragile tundra and/or plant communities, or impacts to wildlife, for example forced behavior modification, such as causing animals to scatter (and possibly abandoning their nests, possibly also leaving eggs and/or young susceptible to predation), or by restricting their movements. The introduction of alien species may also occur.

In some areas, soil erosion can result from pedestrian traffic as well as walking tracks from repeated passage. The natural processes of the environment can be disrupted or damaged by physical contact, either by small boats or kayak or by visitors traversing through a given area. The introduction of alien species can disrupt scientific studies or cause other harm from intrusions into protected areas. The degradation of buildings and artifacts through physical contact can result from visits to historical and/or archaeological sites. Visits can also result in increased humidity inside buildings, the removal of objects, artifacts and/or or

defacement. The introduction of alien species can disrupt scientific studies or cause other harm from intrusions into protected areas.

Damage can occur if operations of the auxiliary boats and kayaks during the launching procedures are not conducted properly to avoid damage to the sea floor and other biota if touched. Damage can be significant and lead to local loss of fragile species. Impacts can contribute to degradation both biological and aesthetic.

Minimization and Mitigation:

Minimization and mitigation measures include education, which is viewed as being the key factor toward ensuring that crew, expedition staff and guests are educated and briefed appropriately. The Expedition Leader is responsible for ensuring that the appropriate briefings are provided to passengers and expedition staff and that the relevant training is provided to the vessel's crew. Briefings will include examples of non-interfering behavior, specific points regarding movement and behavior ashore at the various landing sites. Guests will be briefed on general interactions with wildlife including polar bears, other predators, and other Arctic species and the dangers they may pose. Guests and expedition team members will also be briefed on responsibilities and requirements regarding wildlife and wildlife habitat protection. This includes pre-landing briefings on wildlife sensitivities and potential hazards, proper wildlife viewing techniques and safety practices.

The Expedition Leader is responsible for managing activities off of the ship, including auxiliary boat and kayak operations, shore landings and specialty activities with the assistance of the expedition team, with the assistance of the Asst. Expedition Leader. Activities ashore during the expedition landings will depend upon the highlights of each site but may include guided walks or hikes; or to view wildlife, flora and sites of unique geological interest.

Prior to disembarking guests for activities ashore, the Expedition Leader and Captain will assess the landing site with the specific purpose of evaluating the landing against safety and environmental conditions.

As the guests arrive to the landing sites the Expedition Leader, Member in Charge (Asst. Expedition Leader) and/or expedition staff will brief each boatload, emphasizing specific points of importance. In all briefings, conservation issues will be stressed. Printed materials and lectures before the first disembarkation serve to address the potential areas of adverse impact by assessing activities that may result in impacts before the first disembarkation.

Anchoring is prohibited within marine protected areas or marine reserves.

Ship's command and the Expedition Leader are aware of *Species at Risk* to ensure that activities do not impact these species. Environment and Climate Change Canada's "Environment Assessment Best Practice Guide for Wildlife at Risk in Canada" (http://www.sararegistry.gc.ca/virtual_sara/files/policies/EA%20Best%20Practices%202004.pdf) provides information on what is required when Wildlife at Risk, including *Species at Risk*, are encountered or affected by the Project.

Information on Migratory Birds is known from the following documentation:

- Canadian Wildlife Services' "Key Migratory Bird Terrestrial Habitat Sites in the Northwest Territories and Nunavut" (<http://publications.gc.ca/site/eng/317630/publication.html>)
- Canadian Wildlife Services' "Key Marine Habitat Sites for Migratory Birds in Nunavut and the Northwest Territories" (<http://publications.gc.ca/site/eng/392824/publication.html>)

These guides provided information on key terrestrial and marine habitat areas that are essential to the welfare of various migratory bird species in Canada.

Environment and Climate Change Canada's "Incidental Take" web page and the fact sheet "Avoidance of Detrimental Effects to Migratory Birds (Incidental Take)" (<http://www.ec.gc.ca/paom-itmb/>) provides information on how to protect migratory birds, their nests and eggs when planning or carrying out project activities.

To minimize wildlife interactions the following will be standard operating procedures:

- Any interactions with bears should be avoided if at all possible.
- Auxiliary craft should stay clear of any swimming polar bears and under no circumstances approach them. If swimming bears are encountered, the boats should stop, move away, and allow the swimming bear(s) to proceed in the direction of their choosing.
- Distances to polar bears will be as per the Government of Nunavut, Department of Environment recommendations below.
- A Polar Bear Safety Plan must be in place to deal with potential interactions with polar bears during activities. The Plan has considered protective firearm usage, including alternative bear deterrent techniques/measures for early detection and non-lethal avoidance and the hiring of qualified and experienced Bear Guards. The Company's plan is available upon request. (See also the additional information below.)
- Interactions with problem wildlife or any interaction with carnivores must be reported to the nearest Government of Nunavut, Department of Environment Conservation Officer as soon as possible.
- In the unlikely event a bear has to be shot in self-defense in the Inuvialuit Settlement Region (ISR), the wildlife kill will be reported as soon as possible to a Renewable Resource Officer since there are potential compensation issues re wildlife kills in the ISR.
- While on cruise ship or auxiliary watercraft (Expedition boats or kayaks), viewing time of each concentration of marine mammals will be limited to a maximum of thirty (30) minutes in order to minimize disturbance.
- There will be no attempt to intersect or interfere with the movements of marine mammals by the vessel or auxiliary watercraft (Expedition boats or kayaks). Strategic positioning of vessels ahead of the path traveled by mobile whales and waiting for the whales is also prohibited.
- Visitation of cliffs or seabird colonies used by nesting and breeding birds is restricted to Expedition boats and kayaks only, and then only during morning and early afternoon hours. Noise will be kept to a minimum when visiting these bird colonies.
- Activities will avoid the seaward site of seabird colonies and areas used by flocks of migrating waterfowl by three (3) kilometers.
- Activities that may interfere with the migration or calving of caribou or muskox will cease, until the caribou or muskox have passed or left the area.

The following recommendations from Government of Nunavut, Department of Environment, will also be followed as standard operating procedures:

- All provisions of the *Wildlife Act* (<http://laws-lois.justice.gc.ca/eng/acts/W-9/>) and the associated regulations are to be followed at all times.
- Keep at least 100 metres away from bears and large mammals (both marine and terrestrial), 25 metres from small animals and nesting birds (-100 metres from fledgling raptors) (while on land or in small vessels). If viewing from the main vessel, try to keep 400m away.
 - Give wildlife plenty of space. Binoculars and spotting scopes allow wildlife viewing without getting too close. Approach animals slowly, quietly, and indirectly. Always give them an avenue for retreat, and never pursue an animal.
 - Avoid noises or actions that might stress wildlife or cause animals to waste energy in unnecessary flight.
- Do not approach young or baby animals.

- Avoid approaching animals that are breeding, nesting, brooding, denning or raising young without the accompaniment of your local guides.
- Be aware of how to recognize and respond to signs of alarms
 - These are sometimes subtle, and they vary between species, but may include increased movements such as agitated flapping or pacing, heightened muscle tension, staring, or frequent vocalization. If you sense that an animal is disturbed by your presence, back off. If it still does not resume its normal behaviors, leave it alone.

As identified in Section 7.o., the Company's Polar Bear Manual provides standard operating procedures for polar and black and brown bears. Bear deterrents for guides include 30.06 caliber manual bolt rifles. (The Firearm's list, including rifles and flare guns, is available upon request.) Non-lethal deterrents including flare guns, air horns and noisemakers. These deterrents are part of the shore landing kit, which is taken ashore as part of the standard operating procedure when landing guests in wilderness areas. Lethal rounds will only be used in the defense of life or property. Any interactions with polar bears will be reported to the nearest Government of Nunavut, Department of Environment Conservation Officer as soon as possible.

A Wildlife Observation License from Government of Nunavut's Department of Environment will be obtained in advance of activities occurring for sightseeing activities and landings in wilderness areas in Nunavut with a report on wildlife sightings provided at the conclusion of the voyage.

The following provide advice on bear and carnivore safety:

Government of Nunavut's booklet on Bear Safety:

http://gov.nu.ca/sites/default/files/bear_safety_-_reducing_bear-people_conflicts_in_nunavut.pdf

"Safety in Grizzly Bear and Black Bear Country" pamphlet:

https://www.enr.gov.nt.ca/sites/enr/files/resources/safety_in_grizzly_and_black_bear_country_english.pdf

Bear Smart Society video:

<http://www.bearsmart.com/play/safety-in-polar-bear-country/>

Information on bear safety can be found on the Parks Canada website at:

<http://www.pc.gc.ca/eng/pn-np/nu/quttinirpaaq/visit/visit6/d.aspx>

Visits to sites of historical and archaeological significance are planned and a Class 1 Archaeological Permit is being sought from Government of Nunavut's Department of Culture & Heritage. It is understood, however, that all sites have cultural importance. A policy of 'take only photographs and leave with only memories' policy will be in place. The Company's "Guidelines for Visitors to Archaeological and Historic Sites" is included as **Appendix F**.

Existing trails will be used, where possible, during project activities on land to minimize disturbance. Land use areas will be kept clean and tidy at all times, with any garbage collected and returned to the ship for proper disposal.

Should any guest violate the rules, the Expedition Leader, Member in Charge (Asst. Expedition Leader) and/or expedition staff supervising shore activities may remove the offending participant from the site and prohibit participation should he/she be concerned over the individual's future behavior. Experience has shown that in nearly all cases, guests are champions of the environment and overwhelmingly support measures to minimize adverse environmental impact.

The Company will seek information about traditional knowledge and guiding principles, as well as information about current recreational and traditional usage of the project area to inform future planning.

Hurtigruten will solicit direct engagement with local residents through communication with the hamlet communities and with the local agents arranging services in advance and will continue to look for ways to encourage a dialog with potentially interested groups and individuals prior to undertaking future project activities.

15.f. Introduction of Alien Species and Translocation of Diseases

Origins:

The risk of introduction of non-native alien species (those species that do not naturally occur in an area and have been introduced intentionally or unintentionally) and translocation of external diseases is ever-present due to direct and rapid inter-continental transfers. Introduced species include microbes, algae, fungi, vascular plants, invertebrates, fish, birds and mammals. Introduction could occur through a number of pathways, including packaging, contaminated clothing or equipment, and even importing uncooked food.

There is potential for impacts to the terrestrial environment, including sites of cultural, historical, paleontological and geological importance, in the southeast Baffin Island region. The probability of impacts occurring is considered to be low, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence due to the intermittent nature of the proposed tourism activity and reversible in nature.

Assessment:

Human activities have the potential to act as a vector for non-native species. Populations are susceptible to infection by disease and scavenging of unsecured food waste by birds, for example, is a simple route for these to enter the system. The possibility exists for the spread of diseases from one colony to another should disruption occur. The local biota could be significantly impacted should introduction or translocation of alien species, soils or microbes occur. In some areas, impacts may extend to rare and/or endangered species. Unclean footwear, clothing or equipment and on small boats, can introduce soil and seeds which may result in the accidental transfer of non-native organisms.

Minimization and Mitigation:

Standard operating procedures such as boot, clothing and equipment decontamination for small auxiliary boat operations and shore landings will be followed strictly to ensure the prevention of introduction of translocation of non-native species and disease.

ROALD AMUNDSEN will apply the following practices to minimize the likelihood of introduction of alien species or diseases:

For the vessel:

- Rat guards in place on mooring lines,
- Gang plank lifted at night or, if lowered, lit with flood lights,
- External doors and windows closed whenever possible,
- Proper food handling, secure storage and proper disposal of waste generated on board,
- Insect traps in place in food storage areas,
- Old foods removed from food storage areas at the end of the voyage,
- Prohibiting the taking of uncooked poultry products or eggs ashore, and
- Ensuring that procedures are followed for boot, clothing, and equipment decontamination.
- Use of hand-washing stations with disinfecting solutions positioned throughout the vessel.

For the auxiliary watercraft (tender boats and kayaks):

- Insides of watercraft cleaned,
- Hulls of watercraft cleaned before loading, and
- Cleaning of watercraft in between activities/landings and between areas of operation.

The Expedition Leader has responsibility for briefing all those going ashore on Biosecurity measures. Participants will be strongly encouraged to check and, if necessary, clean their clothing (including Velcro cuffs, pockets, seams, socks, trouser hems and cuff turn-ups, fleece, zippers, and/or hood of jackets) and equipment (including items such as camera tripods, trekking poles, daypacks, camera bags and rucksacks, etc.) prior to the shore landings. Those who may have recently gone trekking, tramping, backpacking, or farm visiting prior to the voyage will be advised they must check their items especially carefully to ensure they have removed all foreign material. Washing boots, walking sticks and camera tripods with a disinfectant (biocide) agent before and after each expedition site landing will reduce the likelihood of impacts from occurring.

15.g. Dependent and Associated Ecosystems

Origins:

Aspects of the proposed activity that are likely to affect dependent and associated ecosystems are:

- Emissions to air: contribution to regional and global air pollution burdens,
- Removal of wastes: increased landfill in port reception facilities; indirect effect of contamination of soil and groundwater and disease transfer during sewage handling, and
- Physical presence: disturbance of migratory species or dependent and associated ecosystems, and
- Potential negative impacts to soil quality and terrestrial ecosystem integrity from land-based tourism activities.

There is potential for impacts to shoreline and land-based tourism activity sites. The probability of impacts occurring is considered to be low, with potential adverse effects anticipated to be low in magnitude, infrequent in occurrence due to the intermittent nature of the proposed tourism activity and reversible in nature.

Habitat disruption is a potential impact to marine animals that can result from the presence of auxiliary boats, kayaks, and auxiliary equipment. Potential impacts could include noise from the engines and activities, water turbulence resulting from the operation of the auxiliary boats, and pollution from exhaust and inadvertent engine discharges. Piloting the auxiliary boats with improper navigation and a high rate of speed could result in harmful interference of sea birds and marine animals in the water, in near shore environments or on ice floes.

Assessment:

Emissions from routine operations have the possibility to lead to impact from airborne pollution and contamination of soils, snow and/or ice with an indirect effect of pollution of local environments. The potential cumulative effect is a contribution to regional and global air pollution.

Routine operations involving domestic, food and/or hazardous waste (removed as required by Canadian legislation) can result in an increase in landfill (when offloaded) and an increase in engine emissions (when transporting waste to disposal sites) leading to an indirect impact by contamination of soil and groundwater; damage to local ecosystems and loss of habitat. The potential cumulative effect is a need for more landfill space at reception sites; loss of habitats; increasing soil and groundwater contamination; and an increasing contribution to regional air pollution.

Routine operations involving human waste (solid and liquid) have a direct effect of increasing sewage treatment at reception sites and an increase in engine emissions in the transportation of waste. The indirect effect is disease transfer during sewage handling; impact on human health at reception sites; contamination from the use of detergents during cleaning of containers and loading on surrounding ecosystems and habitats. The potential cumulative effect is an increased loading on the surrounding ecosystems and increased air pollution.

The physical disturbance from routine operations can lead to a loss of aesthetic or wilderness value and disturbance of wildlife leading to an indirect effect of an increase in the 'footprint.' The potential cumulative effect is a loss of tourism value.

Minimization and Mitigation:

ROALD AMUNDSEN will be used to carry out garbage so that no garbage is disposed of in Canadian waters, thereby complying with the 'zero discharge' provisions of the *Arctic Waters Pollution Prevention Act*.

Prevention (when possible), enforcement of strict operating procedures, limiting group sizes for land-based activities, proper supervision by experienced guides, utilizing existing trails where possible when conducting activities on land, ensuring land use areas are properly maintained, and enforcing Biosecurity measures are the primary means to avoid or minimize impact to the environment.

Measures to mitigate potential impacts also includes proper training and supervision, following established guidelines and standard operating procedures, good maintenance, use of newer equipment (emissions); minimizing wastes and reducing packaging (domestic/good/hazardous waste); and securing containment and utilizing biodegradable containers (human waste).

16. Clean-up, Reclamation, Disposal and/or Decommissioning Plans

As the proposed activity is anticipated to have not more than a minor or transitory environmental impact, the necessity for any clean-up, reclamation, disposal and/or decommissioning plans is not expected.

17. Additional Information

Appendices:

- Appendix A: Voyage Plan (Voyage AMNWP1911)
- Appendix B: Route Map
- Appendix C: Alternative Itineraries
- Appendix D: MS ROALD AMUNDSEN Vessel Questionnaire
- Appendix E: Expedition Staff List and Biographical Sketches (current as of submission date)
- Appendix F: Guidelines for Visitors to Archaeological and Historical Sites

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Appendix A: Voyage Plan (Voyage AMNWP1911)

Subject to change based on weather, ice and other factors.

AMNWP1911	Ship	EASTBOUND SAILING	Harbour	Country	Region	ETA	ETD
	8/20/19 Amundsen	Anchored	Kangerlussuaq	Greenland	Arctic		8/20/19 23:59
	8/21/19 Amundsen	Anchored	Itilleq	Greenland	Arctic	8/21/19 11:00	8/21/19 17:00
	8/22/19 Amundsen	Anchored	Ilulissat	Greenland	Arctic	8/22/19 10:00	8/22/19 18:00
	8/23/19 Amundsen	Alongside	Sisimiut	Greenland	Arctic	8/23/19 9:00	8/23/19 16:00
	8/24/19 Amundsen	At Sea					
	8/25/19 Amundsen	At sea					
	8/26/19 Amundsen	Anchored	Pond Inlet	Canada	Arctic	8/26/19 6:00	8/26/19 16:00
	8/27/19 Amundsen	Anchored	Dundas Harbour	Canada	Arctic	8/27/19 8:00	8/27/19 15:00
	8/27/19 Amundsen	Cruising	Croker Bay	Canada	Arctic	8/27/19 18:00	8/27/19 19:00
	8/28/19 Amundsen	Anchored	Beechey Island	Canada	Arctic	8/28/19 9:00	8/28/19 17:00
	8/28/19 Amundsen	Cruising	Prince Leopold Island	Canada	Arctic	8/28/19 21:00	8/28/19 22:00
	8/29/19 Amundsen	Anchored	Fort Ross	Canada	Arctic	8/29/19 12:00	
	8/30/19 Amundsen	Anchored	Fort Ross	Canada	Arctic		8/30/19 9:00
	8/30/19 Amundsen	Cruising	Conningham Bay	Canada	Arctic	8/30/19 14:00	8/30/19 18:00
	8/31/19 Amundsen	Cruising	James Ross Strait	Canada	Arctic	8/31/19 6:00	
	9/1/19 Amundsen	Anchored	Gjøa Haven	Canada	Arctic	9/1/19 6:00	9/1/19 13:00
	9/2/19 Amundsen	Anchored	Cambridge Bay	Canada	Arctic	9/2/19 9:00	9/2/19 18:00
	9/3/19 Amundsen	At Sea					
	9/4/19 Amundsen	Anchored	Ulukhaktok	Canada	Arctic	9/4/19 10:00	9/4/19 18:00
	9/5/19 Amundsen	Anchored	Smoking Hills	Canada	Arctic	9/5/19 11:00	9/5/19 22:00
	9/6/19 Amundsen	At Sea					
	9/7/19 Amundsen	At Sea					
	9/8/19 Amundsen	Anchored	Point Barrow	USA	Arctic	9/8/19 6:00	9/8/19 18:00
	9/9/19 Amundsen	At Sea					
	9/10/19 Amundsen	Cruising	Little Diomed Island	USA	Arctic	9/10/19 8:00	9/10/19 10:00
	9/10/19 Amundsen	Anchored	Port Clarence	USA	Arctic	9/10/19 16:00	9/10/19 22:00
	9/11/19 Amundsen	Anchored	Nome	USA	Arctic	9/11/19 8:00	

Appendix B: Route Map



MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Appendix C: Alternative Itineraries

Please refer to the next two pages.

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

	STATUS	PORT	COUNTRY	COMMENTS/ACTIVITIES
MS ROALD AMUNDSEN PLAN B				
20/08/2019	Anchored	Kangerlussuaq	Greenland	Disembarking
20/08/2019	Anchored	Kangerlussuaq	Greenland	Embarking
21/08/2019	Anchored	Itilleq	Greenland	Landing
22/08/2019	Anchored	Ilulissat	Greenland	Landing
23/08/2019	Alongside	Sisimiut	Greenland	Bunkering
24/08/2019	At Sea		Greenland	
25/08/2019	At Sea		Canada	
26/08/2019	Anchored	Pond Inlet	Canada	Clearance Canada, town package, cruise Eclipse sound after departure.
27/08/2019	Anchored	Dundas Harbour	Canada	Landing at historic site. Hikes. Possible kayak
27/08/2019	Cruising	Croker Bay	Canada	Ship cruise glacier
28/08/2019	Anchored	Beechey Island	Canada	Landing at historic site (small groups). Hikes. Possible kayak. Hike Caswell Tower.
28/08/2019	Cruising	Prince Leopold Island	Canada	Ship cruising, bird cliffs Possible ice navigation. Landing (hike/kayak). Overnight at anchor - scout Bellot Strait by boat
29/08/2019	Anchored	Fort Ross	Canada	
30/08/2019	Anchored	Fort Ross	Canada	Transit Bellot Strait after departure
30/08/2019	Cruising	Exploration day	Canada	Sea-ice landing?
31/08/2019	Cruising	North Arm	Canada	Landing
01/09/2019	Cruising	Isabella Bay	Canada	Landing? (National Wildlife Area. No landing and no entry to the NWA)
02/09/2019	At Sea		Canada	
03/09/2019	At Sea		Canada	
04/09/2019	Anchored	Butterfly Bay, Hantzsch Island	Canada	Landing at Butterfly Bay. Tenderboat cruise Hantzsch Island.
05/09/2019	Anchored	Cabot Island, NU	Canada	Tenderboat cruising
06/09/2019	Cruising	Saglek Fiord (NL)	Canada	Ship cruise/possible tenderboat cruise
07/09/2019	At Sea		Canada	
08/09/2019	At Sea		Canada	
09/09/2019	Alongside	St. Anthony/ L'anse aux Meadows	Canada	Landing and visit to Viking site
10/09/2019	At Sea		Canada	
10/09/2019	At Sea		Canada	
11/09/2019	Alongside	Halifax	Canada	Disembarking/Embarking
MS ROALD AMUNDSEN PLAN C				

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

20/08/2019	Anchored	Kangerlussuaq	Greenland	Disembarking
20/08/2019	Anchored	Kangerlussuaq	Greenland	Embarking
21/08/2019	Anchored	Itilleq	Greenland	Landing
22/08/2019	Anchored	Ilulissat	Greenland	Landing
23/08/2019	Alongside	Sisimiut	Greenland	Bunkering
24/08/2019	At Sea		Greenland	
25/08/2019	At Sea		Canada	
26/08/2019	Anchored	Pond Inlet	Canada	Clearance Canada, town package, cruise Eclipse Sound after departure.
27/08/2019	Anchored	Philpot's Island	Canada	Landing at historic site. Hikes. Possible kayak
27/08/2019	Anchored	Grise Fiord	Canada	Landing. Community visit
28/08/2019	Anchored	Craig Harbour	Canada	Landing
28/08/2019	Cruising	Alexandra Fiord	Canada	Exploration. Ship cruising. Possible tenderboat cruise.
29/08/2019	Cruising	Exploration day	Canada	
30/08/2019	At Sea		Canada	
30/08/2019	At Sea		Canada	
31/08/2019	Anchored	North Arm	Canada	Landing
01/09/2019	Cruising	Isabella Bay	Canada	National Wildlife Area. No landing. No entry to the NWA.
02/09/2019	At Sea		Canada	
03/09/2019	At Sea		Canada	
04/09/2019	Anchored	Butterfly Bay, Hantzsch Island	Canada	Landing at Butterfly Bay. Tenderboat cruise Hantzsch Island
05/09/2019	Cruising	Cabot Island, NU	Canada	Tenderboat cruising
06/09/2019	Cruising	Saglek Fiord (NL)	Canada	Ship cruise/possible tenderboat cruise
07/09/2019	At Sea		Canada	
08/09/2019	At Sea		Canada	
09/09/2019	Alongside	St. Anthony/ L'anse aux Meadows	Canada	Landing and visit to Viking site
10/09/2019	At Sea		Canada	
10/09/2019	At Sea		Canada	
11/09/2019	Alongside	Halifax	Canada	Disembarking/embarking

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Appendix D: MS ROALD AMUNDSEN Vessel Questionnaire

Please refer to the next 7 pages.

Appendix D – MS ROALD AMUNDSEN Vessel Questionnaire

Vessel Name	MS ROALD AMUNDSEN
AIS-SART (AIS Search and Rescue Transmitters) in life-saving appliances	Yes - 4
Anchors	2
Arctic Trips Since Year	0
Anti-fouling Certificate	Yes
Approved SOPEP	Yes
Automation System	Acon IAS
Auxiliary Engine	2 x Bergen Engines type B33:45L6A
Ballast Amount – Normal Operation (m. ton)	150m3
Ballast Capacity (m. ton)	1075,8 m3
Ballast Exchange Frequency – (days)	TBA
Ballast Exchange Frequency - Normal Operation (days)	TBA
Ballast Water Management Plan	Yes
Bilge Water Holding Capacity (cbm)	49.4
Bilge Water Holding Capacity (days)	30
Bilge Water Separator Type Approval Certificate (IMO Resolution MEPC 60 (33) 30 Oct 1992))	Alfa Laval, pure bilge water cleaning system for 5 ppm, MED-B-9041
Bilge Water Separators (limited to below 15 ppm) (cbm / hours)	2,5 m3
Black Water Management Plan	Yes
Black Water Capacity (cbm)	2 x 26,1 m3 treatment plant Bio residue/ black water
Black Water Capacity (hours)	Treatment plan
Boiler	Oil fired 1500Kw
Bow	Bulbbow
Breadth moulded (m)	23.6 m
Bridge to bow (m)	23.6 m
Bridge to Stern (m)	116.4 m
Call Sign	LAZP7
Certified Black Water Treatment Plant	Yes
Certified Oily Water Separator (OWS)	Yes
Certified OWS with 15ppm Alarm & Automatic Shut-Off	Yes 5ppm
Class Notation	DNV+1A1, PC-6, passenger ship, ECO, F-MC, LCS-DC, BIS, CLEAN, COMF-C(1), COMF-V(1) for passenger area, COMF-C(3),COMF-V(3) for crew area, Battery power
Classification Society	DNV

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Code (AECO – Post Visit Reporting)	YES. Member of AECO
Crew Capacity	151
Damage Control Equipment	Yes
Damage Control Manual	Yes
Deadweight, Normal Operation (m. ton)	1800
Depth moulded (m)	16 m (deck 6)
Diver & Equipment for Polar Waters	Under water drones x 2
Draft Max (m)	5.3m
Echo Sounder 1,2,3, etc	2
Echo Sounder Transmission Power and Frequency	TGM 60-50-25L TGM 60-200-25L
Echo Sounder Type	Skipper GDS102 10/250Hz
Email	Master.ra@hurtigruten.com EL tbc
Emergency Generator	Yes
Emergency Medical Evaluation Response Plan	Yes
Fax	No
Fire Control Plan	Yes
Fresh Water Capacity (cbm)	650
Fresh Water Consumption (cbm/24 Hrs)	140
Fresh Water Production (cbm/24 Hrs)	300
Fuel Consumption per 24 Hrs - Max (m. ton)	42.4 m t/day
Fuel Consumption per 24 Hrs – Normal Cruising (m. ton)	31 m t/day
Fuel Consumption per 24 Hrs – Penetrating Ice (m. ton)	NA
Gas Oil (GO) Capacity – Normal Cruising (m. ton)	590 m3
GMDSS Sea Area	A4
Grey Water Capacity (cbm)	325
Grey Water Capacity (days)	Treated GW
Gross Tonnage	20889
Heavy Fuel Oil (HFO) Capacity – Normal Cruising (m. ton)	N/A
Helicopter Deck	Pick up zone
Helicopters On Board	Nil
HFO Specification, Grade (IFO 380, IFO 180, >IFO, etc.)	N/A
HFO Storage Tanks (Type & Location)	N/A
Hull Material	Steel
Hydrographic Work	No

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

IAPP Certificate	Yes
Ice Class	PC6
IMO Number	9813072
Incinerator Burning Temperatures	0
Incinerator Capacity	NA
Incinerator Frequency of Use	0
Incinerator Type	NA
International Air Pollution Prevention Certificate	Yes
International Oil Pollution Prevention Certificate	Yes
International Ship Security Certificate	Yes
International Tonnage Certificate (1969)	Yes
IOPP Certificate	Yes
Length Overall (LOA) (m)	140
Length Between Perpendiculars (LBP) (m)	133.5
Lifeboats	4 x 150 persons
Liferafts (those for which approved launching appliances are required)	2 x MES (3 x 101 persons each) 606 persons total
Light ship	
LO Storage Tanks (Type & Location)	16,7 and 16,8 m ³ Frame 48-54 and 60-65. 4800 Ab.BL
Lubricating Oil Capacity - Normal Cruising (m. ton)	40m ³
Lubricating Oil Storage Tanks (Type & Location)	16,7 and 16,8 m ³ Frame 48-54 and 60-65. 4800 Ab.BL
Main Engine	2 x Bergen Engines type B33:45L6A
Management Company	Hurtigruten
Maritime Labour Certificate	Yes
MARPOL 73/78 Annex IV Compliance	Yes
Medical Chest Certification	Yes
Member of AECO	Yes (member status)
Member of Other	IAATO (operator status)
MMSI	TBA
Morgue facilities	Yes
Name	MS Roald Amundsen
Net Tonnage	7465
Number of Doctors onboard	1
Number of hospital beds	5
Number of Nurses or other medical staff onboard	2
Number of Zodiacs/Landing Craft	15
Oil Record Book	Yes
Oil Spill Containment Equipment	Yes

MS Roald Amundsen
Hurtigruten Cruise AS Northwest Passage

Oil Spill Response Company	National Response Corporation (NRCorp)
Operator Name	Hurtigruten Cruise AS
Operational Area	Unlimited
P&I Insurance (Amount in USD)	The cover afforded for passengers and seamen/crew risks combined is limited to USD 3 billion (USD 3,000,000,000) any one event. The cover afforded for passenger risks shall further be limited to USD 2 billion (USD 2,000,000,000) any one event. (Coverage through Gard)
Passenger Capacity	530
Passenger Ship Safety Certificate (SOLAS 1974 as modified, regulation I/7, for international voyages)	YES
Polar Water Operational Manual (IMO)	YES
Pollution Liability Insurance (Amount in USD)	Limited to USD 1 billion (USD 1,000,000,000) each incident or occurrence (Coverage through Gard)
Port/Country of Registry	Tromsø, Norway
Propellers	2
Propulsion Motors	2
PSSC Total # of Persons	681
Rescue Boats	2
Safety Management Certificate	Yes
SART (Radar Search and Rescue Transponders) in life-saving appliances)	Yes
Sel-Call	VHF/MF/HF DSC
Sewage Treatment Plant	Scanship Advanced waste water syst. MEPC-227(64) incl sect.4.2
Sewage Holding Tank Capacity	2 x 26.1
Shipboard Oil/Marine Pollution Emergency Plan (SOPEP/SMPEP)	Yes
Ship Type	Passenger vessel
Sludge Oil Holding Capacity (cbm)	22.7
Sludge Oil Holding Capacity (days)	90
Sonar	No
Sonar Transmission Power and Frequency	NA
Sonar Type	NA
Speed – Max (kn)	16.3
Speed - Normal Cruising (kn)	15
Stabilizers	Yes
Stability Declaration (SOLAS 74 Reg. 22 / LL Reg. 10(2))	Yes
Steering Gears	Azipull
Telephone/Telefax/Emergency Phones	Vessel is new construction. Info below to be confirmed closer to launch.

	Voice: INMARSAT M Satellite Stations: NA Fax: LRIT : Yes EPIRB(s): HEX code: MMSI: IMO: Call Sign: LAZP7 SARTS:
Telex	TBA
Thrusters	2
Under Water Welding Facilities	N/A
Untreated Grey Water Discharged Directly Overboard (cbm/hours)	0
VDR	SAM 4360
Vessel Type	Passenger vessel
Waste Management Plan	Yes (in progress)
Water Consumption Rate (Daily amount (m ³))	140
Water Retrieval Methods	Production on board (reverse osmosis)
Water Retrieval Location	Produced in Engine space
X-ray equipment	Yes
Year Built	2019

Nautical-Navigational-Communications Equipment

- RRM Aquarius 100 Folding fin Stabilization system.
- FRAMO, Alfa Laval Anti-heeling system
- RRM joystick/DPO system incl. Fugro GNSS reference system.
- Navigation operator stations and ice radar. Radar transceivers- X-band radar, 8ft antenna SAM NACOS Platinum GR3050A001 MB, x2; S-band radar, 14ft antenna SAM NACOS Platinum GR3051A001 MB, x1. Navigation workstation for Nacos Platinum incl. SRTP station- Multiplot Platinum control panel, 4 fwd, 1 ps, 1sb and 1 in SRTP bridge x7; Operating panels with trackball, radar panel, Trackpilot/Speedpilot panel on WS 2 and 3, x2; operating panels with standard keyboard and trackball on WS 1 and 4, 2x; operating panels with Trackman BD3014 on wings and SRTP bridge, x2. Conning, Ecdis and Multi pilot monitors on wings and fwd. Wärtsillä AZ3073G24, x10. Sigma S6 Iceradar processor, keyboard and trackball x1.
- Satellite position system and AIS- SAAB R5 Supreme DGPS, x1; SAT compass JLR-21 for SRTP bridge, x1; GPS Sailor 6561 for SRTP bridge, x1; Sailor 6003 for SRTP bridge, x1; AIS transponder R5 SUPREME, x1.
- Autopilot, tracksteering and speedpilot system- Trackpilot Platinum on WS 2 and 3, x2; Trackpilot interface units on WS 2 and 3, x2.
- Gyro compass system- Anschütz STD22 gyro compass, x1; Anschütz STD30 gyro compass, x1; Anschütz distribution switch-over units, x2; Anschütz control units, x2; Interface for external GPS compass and magnetic compass, x1; Anschütz 74881 repeater compass 360/10 flush w/ dimmer, x1; Anschütz 74880 bearing repeater 360/10, x2; Anschütz 74833 digital repeater for OH, incl. dimmer, x1.
- Echo sounder, Speedlog and Satlog- Skipper GDS102 dual channel 10/250Hz echo sounder, x2; Transducer TGM 60-50-25L, x1; Transducer TGM 60-200-25L, x1; Nav data box 9512, x1; Speedlog system 2-axis WT and

BT with docking system, x1; digital display 4900, x2; electronic unit for SAM EM Log 4642, x1; log sensor for SB/DB sea valve complete EML, x1; Nav data box 9512, x1; Satlog SLS 4120 electronic unit, x1; R5 DGPS Nav system, x1; Nav data box 9512, x1.

- NAPA loading System
- CCTV System
- VDR, BNWAS/BAM, Sound Reception- Voyage data recorder SAM 4360, x1; Core module, x1; Float free capsule Jotron, x1; Fixed recording medium HVR04 (L3 Aviation, x1; BNWAS/BAM system, x1; Duty alarm panel DAP2200 Bridge, x1; Sound reception system Zenitel Vingtor VSS-V2, x1.
- Radio Station (GMDSS A4)- Sailor VHF 6222 GMDSS Class A DSC, x2; Sailor control and transceiver unit, x1; Sailor 6210 handset with cradle, x2; Sailor 6204 remote handset, x2; Sailor 6300 MF/HF radio station, x2; Sailor 6301 Control unit DSC A, x2; Sailor 6006 message terminal, x2; Printer H1252B OKI Microline 260 24VDC, x3; Sailor 6360 150w transceiver, x2; Sailor 6110 INM-C GMDSS, x1; Sailor 6006 message terminal P6110, x1; Sailor 6103 GMDSS Alarm panel, x1; Furuno Novtex NX-700B, x1; Iridium telephone system, x1.
- GMDSS Emergency Communication- Jotron Tron TR-20 GMDSS portable VHF, x5; Jotron Tron SART radar transponder for life rafts, x4; Jotron Tron 60S Freefloat EPIRB, x1; Jotron Tron 60S manual emerg. Beacon, x1.
- Satellite Communication- Sailor Fleet Broadband 250 system, x1.
- VHF, UHF, NDB, Airband radio- Sailor 6210 VHF, x1; Sailor 6201 handset w/cradle, x1; Sailor 6204 VHF slace handset. ECR/Tender garage, x2; Sailor SP3510 portable VHF, x6; UHF digital communication system, x1; MTR-3000 repeaters, x3; UHF Motorola DM4600. Bridge, ECR and Tender garage, x5; UHF Motorola DP2600 portable, x31; UHF Motorola DP4400 ATEX portable, x9; non-directional Beacon NDB JTM-30C, x1; Rhotheta RT-300 VS VHF direction finder, x1; Jotron TR-810 airband VHF, x1.
- Aqua Signal Lantern Controllers.
- RRM HCX3 Thruster control system.

Auxiliary Boats (Explorer Boats):

- 15 Oxe 7.0 boats – each of capacity of 18 persons excluding driver
Manufacturer Oxe
- Engine type: Oxe Pro 150 Hp (diesel/MGO)

Safety equipment in Explorer Boats:

- First aid kit (prepacked and water tight)
- Emergency Kit (basic survival kit)
- Hand flares (3)
- Parachute rocket signal (1)
- Parachute anchor
- Basic tools for the engine
- Fire extinguisher
- Ropes and lines
- One towing line forward and one astern, ready for use
- Drift (or sea) anchor
- Paddle oar
- Navigation lights (fixed)
- Boatman's hook
- GPS
- VHF and UHF communications

Kayaks:

Quantity: 12 double, 6 single

Equipment:

- Paddles x 46

- Dry suits: x 70
- Polar-Tec Fleece suit x 70
- Neoprene Shoes x 70
- Neoprene Gloves x 70
- Spray skirts x 13
- Tow lines x 3
- Safety equipment: Drift anchor, first aid kit, hypothermia kit, extra paddle, VHF radio, satellite phone, handheld GPS and extra base layer clothing for the paddler.

Life-saving equipment:


- Rescue boats (MOB) x2, 6 persons each, Palfinger type NDTs 3500H.
- Life boats x2, 150 persons each. Palfinger type MPC32.
- Tender life boats x2, 150 persons each. Palfinger type CTL38.
- Marine Evacuation System (MES) x2, 3x101 persons each. Viking type VEC+ 3A.
- Embarkation ladders x2. Length 16m each.

Appendix E: Expedition Staff List and Biographical Sketches (current as of submission date)

Please refer to the next 10 pages.

Expedition staff list:

Expedition Leader	Tudor Morgan
Expedition Leader (2)	Steffen Biersack
Assistant Expedition Leader	Tomasz Zadrozny
Expedition Coordinator	Ina Schau Johansen
Geologist	Dr. Bob Rowland
Geologist	Marie Klopstad Hernar
Biologist/Ornithology	Dr. John Chardine
Biologist/Ornithology	Dr. Heidrun Oberg
Biologist/Ornithology	Dr. Delphin Ruché
Biologist	Saga Svavarsdóttir
Biologist/Ornithology	Dan Busby
Historian	Arnau Ferrer
Historian/ Anthropologist	Maurice van de Maele Sr.
Historian	Henryk Wolski
Human culture	Tone Holte
Translator	Juliane Steudel
Photographer	Karsten Bidstrup
Photographer	Stefan Dall
Kayak Guide	Maurice van der Maele Jr.
Kayak Guide	Thomas Grant Olsen
Archaeologist	Dr. Lisa Rankin
Cultural interpreter	Ashley Cummings
Guest Lecturer (Glaciology)	Dr. Olav Orheim

	<p>Tudor Morgan, Expedition Leader.</p> <p>Tudor has always had a passion for polar places. After many Arctic and Alpine expeditions while studying Geology at Manchester University he first went South with British Antarctic Survey wintered as a Field Guide before becoming became Field Operations Manager. After six years he moved on to work for the Antarctic Heritage Trust managing the operation at Port Lockroy and overseeing the conservation of other historic sites. Before joining the full time staff at Hurtigruten he was Operations Manager at IAATO. He has been awarded the Queens Polar Medal for outstanding service to Antarctic science and Heritage.</p>
---	---





Steffen Biersack, Expedition Leader (2).


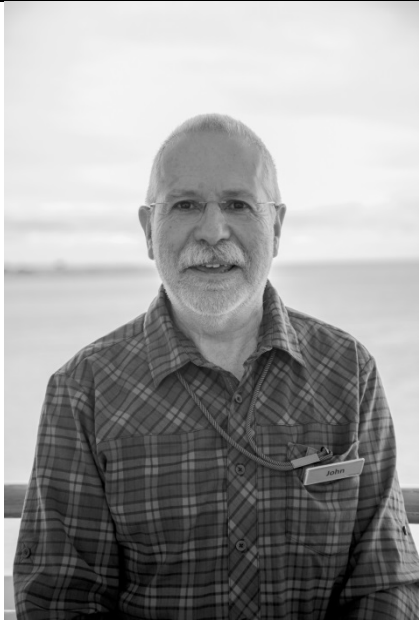
Before joining Hurtigruten, Steffen had an "early life" as a police officer in Berlin, Germany, until he decided to change. He went and studied geology, and with the fresh degree he applied on the Hurtigruten ships as a lecturer. This was over 10 years ago, and ever since the bond to polar areas and Hurtigruten got tighter. If his schedule allows, he will still give a lecture here and there, but now it is mainly his mission to take care of the guests and the Expedition Team. When the guests leave the ship with sparkles in their eyes, after an unforgettable adventure, then - and only then - he knows that the efforts of the Team were well spent...





Tomasz Zadrosny, Assistant Expedition Leader.



Tomasz obtained a Master of Science degree and an Engineering degree in Animal Science at the Agricultural University of Warsaw/Poland. He overwintered twice in Antarctica where he worked as biologist and base commander of the Polish Antarctic Station Arctowski. Since 1999, he is working on board of Passengers Expedition Vessels. His favourite Earth's "corners" are the areas around the Poles - the Polar Regions. There he shares with the guests his personal experience and presents lectures about wildlife of the Arctic and the Antarctic. One of his highlights has been the discovery of a previously unknown channel in Melchior Islands Archipelago on Feb. 2, 2003.


	<p>Ina Johansen, Expedition Coordinator.</p> <p>Ina has been working as a Tour Leader with Hurtigruten since 2000. Some of her best memories from Hurtigruten are Hurtigruten minute by minute, special cruises in Norway with MS Lofoten and all the beautiful nature she has seen all over the world. Before she started work with Hurtigruten, she worked as a lecturer on different cruise ships in Norway and as a staff member at Kandersteg Natur International Scout Centre in Switzerland. She has a university degree in social work and she has also studied marketing management. In her spare time Ina loves to go sailing and fishing.</p>
	<p>Dr. Robert Rowland, Geologist.</p> <p>As a geology under-graduate, he started working on oceanographic expeditions, traversing the Pacific and Indian Oceans. While in the US Army he spent two summers in Antarctica and two in Greenland, studying engineering properties of snow and sea-ice. The field work for his PhD, was conducted along the coast of Alaska and offshore in the Northern Bering Sea. In 20 years with the US Geological Survey, the research ranged from Indonesia to Ivory Coast, and encompassed pollution studies, environmental impact surveys plus project management and the UN Law of the Sea. He circumnavigated after retiring. Bob has been a consultant to the USGS on Law of the Sea issues.</p>

	<p>Marie Klopstad Hernar, Geologist.</p> <p>Growing up on the western coast of Norway, Marie naturally became fascinated with the sea. This led to a fascination of the Earth itself, which resulted in a Masters degree in earth science where she focused on sea level changes after the last ice age. During her studies, Marie became both concerned with, and very interested in how the climate change affects our planet, and especially the impact of a raised sea level. On the not-so-grim side, she loves to travel and experiencing the world, as well as painting it from her side of view.</p>
	<p>Dr. John Chardine, Ornithologist.</p> <p>John is a Canadian ornithologist. After undergraduate and graduate work (to Ph.D) in Canada and UK, he taught university before joining Environment Canada as a Seabird Research Scientist. He has published many papers and reports in scientific journals. His other career is as a lecturer aboard expedition cruise ships, which he has done for the past 25 years. He lectures on ornithology, climate change, oceanography, biogeography and ecology. John has been interested in birds and photography all his life and is also professional bird photographer. His images have been published widely in books and permanent exhibits. He has worked in the Canadian Arctic since 1987.</p>
<p>To be provided</p>	<p>Dr. Heidrun Oberg. Ornithologist. Biography to be provided.</p>


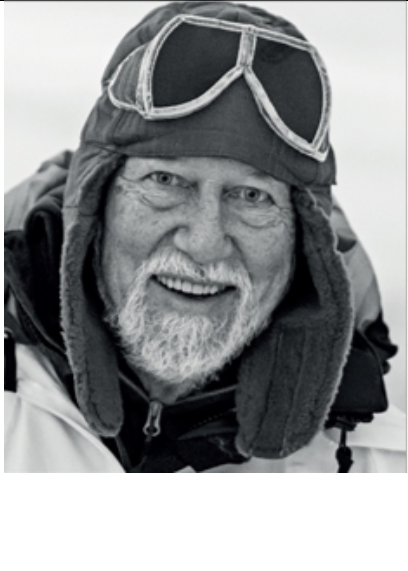
	<p>Dr. Delphin Ruché, Ornithologist.</p> <p>As a wildlife biologist, Delphin has been using science as a passport to study and work around the world. This often brought him to mountainous and high-latitude regions, like Northern Canada where he completed his M.Sc., Antarctica where he overwintered at age 21, or the Ethiopian Highlands where he helped promote a national park. He stayed several years in the USA, teaching at UCLA and participating in various nature conservation projects throughout the country. Meanwhile, he setup and ran a consulting company specialized in radar ornithology. Every summer since 2011, Delphin studies seabirds in Svalbard for the Norwegian Polar Institute, but during the Arctic winter, he works as a northern lights guide in Northern Norway, where he now lives.</p>
	<p>Saga Svavarsdottir, Biologist.</p> <p>Born and raised in a small village in Iceland, Búðardalur Saga feels most at home in the rural parts of the world. After finishing a diploma in rural tourism, she faced her fear of “large” cities and moved to Reykjavik to pursue her dream of becoming a biologist. Her studies brought her to Northern Norway, where she has been based for the last decade. Her work experience consists of everything from guiding dogsledding trips to working with Sami reindeer herders, helping reduce loss of reindeers to large predators. Every summer is spent researching seabirds in Svalbard for the Norwegian Polar Institute.</p>
	<p>Dan Busby, Ornithologist.</p> <p>Dan was born and raised in small towns of the Canadian prairies and now lives in central Canada. He holds a M.Sc. in ornithology. During his 30 years as a wildlife biologist with Canada’s national government, he worked on a wide variety of research and conservation activities, including the effects of toxic chemicals on birds, population monitoring, avian diseases, environmental assessment, species at risk and the effect of wind power developments on birds. He now enjoys his longtime hobby of bird photography and is a frequent speaker on bird photography and bird conservation topics.</p>

	<p>Arnau Ferrer, Historian. Born and raised in Barcelona, Arnau studied History at Universitat Autònoma de Barcelona, where he got a Master in Near Eastern archaeology. After 10 years of field experience in the Euphrates Valley and the Syrian Kurdistan, he began to work as a freelance guide, taking groups to destinations all over the world. He joined Hurtigruten Spain in 1999 and since then has been traveling on the company's ships in Norway, the Arctic and Antarctica. As a licensed Mountain Guide, he enjoys sharing his passion for history, traveling and mountaineering. Since 2005 he is Product Manager at Hurtigruten Spain/Eurovacances. Arnau lives in Terrassa, not far from Barcelona with his wife and two kids.</p>
	<p>Maurice van de Maele, Sr., Historian, Anthropologist. Maurice Ricardo, a social anthropologist from Chile, had since a child two main interests: bird watching and human cultures. Being a teenager he went to many archeological seasons with his father and later on decided to study anthropology specializing in Fuegian cultures. Currently living in world's southernmost city Puerto Williams he has fulfilled both of those early passions. He was Director of the Martin Gusinde Anthropological Museum for 17 years, leading most of the archeological studies on the islands south of Tierra del Fuego. And he also became a keen expert in all southern birds. Still living there, Maurice Ricardo works for the San Sebastian University in long-term research on the Yamana culture, the original inhabitants of the Cape Horn archipelago. He is also a member of the Chilean Ornithological Society and the Omora Foundation, which is dedicated to bio-cultural sustainable development in Chile's Sub-Antarctic Region.</p>

	<p>Henryk Wolski, Historian, sailor.</p> <p>Having been an enthusiastic sailor since boyhood, Henryk Wolski (Poland) worked after his university studies as a sailing instructor and skipper and organized concept sailing trips under historical mottos. Another facet of Henryk’s life is the love to adventurous expeditions. He was a member of ICESAIL Expedition that sailed around the North Pole and an expedition that retraced Sir Ernest Shackleton’s famous voyage. Henryk organized different expeditions like following the tracks of the Vikings across the European continent, or Expedition “Darwin & Tierra del Fuego” s with a replica of a whale boat. Since 2000, Henryk has been working regularly as expedition leader and lecturer on cruise ships, especially in the Antarctic, the Arctic and the Amazon.</p>
	<p>Tone Holte, Cultural historian.</p> <p>Tone is from Oslo, and has worked as an expedition leader for Hurtigruten on the Norwegian coast. She is an actress and singer, doing performances concerning the Nordic ancient history and culture. She has studied Norwegian folklore. Folk songs is a topic she has been working on for several years, publishing books and CDs, lately with her group “Lyra fra Nord”. She has been working particularly with Viking- history and the culture of the Vikings. Polar history is another great interest. Her ancestors were hunters and skippers in the Arctic. Tone’s grandmother actually knew the polar hero Roald Amundsen!</p>

	<p>Juliane Steudel, Translator.</p> <p>Born in Berlin, Juliane studied translation and conference interpreting in Spanish, English and Russian at the University of Leipzig and, as part of her studies, lived in the Basque Country (Spain) and Pyatigorsk in the Northern Caucasus (Russia). After her studies, she returned to her roots and worked in a Berlin-based translation and interpreting agency. In addition to her work in conference management, she has been employed as an interpreter at various events, particularly in the fields of culture and sport. When all is said and done, Juliane prefers to be on a windsurfing board or sitting in a sailboat or at a piano.</p>
	<p>Karsten Bidstrup, Photographer.</p> <p>Karsten was born in Denmark in 1966. Since 1990, he is a professional photographer. He was staff photographer at Denmark's largest travel magazine Vagabond for 15 years. He had numerous assignments in cooperation with the international organization Doctors Without Borders and Photographer was a consultant with the Swedish camera manufacturer Hasselblad A/S. Since 2009, he is associated writer with the largest printed photo magazine in Scandinavia, Digital Foto (feature articles, how-to articles, equipment tests, DIY's etc.). He is author of the motorcycle-travel book "Et andet Africa" ("Another Africa") and Hurtigruten's photo guide book "Cruise With Your Camera". He has undertaken numerous trips as expedition photographer with Hurtigruten in Norway (Svalbard), Greenland, Antarctica, the Falkland Islands and South Georgia.</p>
	<p>Stefan Dall, Photographer.</p> <p>Stefan Dall is a fulltime photographer from Denmark. For more than a decade he has been working with photography and digital design. In 2015 he was featured in the worldwide magazine Photoshop Creative, earning him a spot in the hall of fame with his picture "Animal Kingdom". Stefan's daily work varies from photographing weddings, portraits, nature and photoshoots with sports athletes such as Mo Farah, Peter Schmeichel and Olympic table tennis player Michael Maze. In 2016 he joined the Hurtigruten family and crossed half the globe on MS Midnatsol and in 2017 he traveled to Antarctica as a lecturer and photographer. He thrives when travelling the world and he never leaves home without his trusted camera.</p>

	<p>Dr. Lisa Rankin. Archaeologist.</p> <p>Lisa is a Professor and Research Chair in the Department of Archaeology at Memorial University of Newfoundland. She is also a past-president of the Canadian Archaeological Association. Over the last 35 years she has been involved in excavations throughout North and South America, but her primary research is with the Labrador Inuit. She is currently the principle investigator and co-director of a multi-year, multi-million dollar research project held in partnership with the Inuit of Nunatsiavut. The goal of the partnership is to undertake research requested by Inuit and to help build research capacity in Nunatsiavut.</p>
	<p>Maurice Felipe van de Maele, Kayak Guide.</p> <p>Felipe was lucky to be born in the world's southernmost city: Puerto Williams, in the vicinity of the Cape Horn region. In this area, he developed his passion for wildlife and adventure. At the tender age of eight, he led his first city tour, only with his assistant of 9 to a group of very happy tourists. Today, he is an ACA Kayak Instructor who, after leading several expeditions to the mountains of Navarino Island, navigating around the archipelago and Darwin's mountain range as well as leading kayak expeditions in Greenland. He is proud to be part of the Hurtigruten team and lead kayak excursions in Antarctica.</p>
	<p>Thomas Grant Olsen, Kayak Guide.</p> <p>Thomas was a plumber in Stavanger but always liked to be in the Nature, so he wanted to do something else for a year and moved to the Northern part of Norway to study, this year has turned into several years with studying Sports, Friluftsliv and Arctic Nature Guide at university first, and then worked for several years as a guide on Svalbard. Dogsleding, kayaking, skiing and glaciers is what he enjoys the most to guide in the north. His hobby is kayak-polo and he lives in Longyearbyen with his closest family -- the husky R2-D2.</p>

	<p>Ashley Cummings, Cultural Interpreter.</p> <p>Ashley Komangaapik Rose Cummings is a proud Inuk woman from Pangnirtung, Nunavut. She has worked for North in Focus, and is currently a member of the Prime Minister of Canada's Youth Council, Kids Help Phone's Indigenous Advisory Council, and Apathy is Boring's board of directors. Her collective work aids her as an advocate and active member of her community as she continues to serve it. Komangaapik's culture is integral to her way of life as she ensures that Inuit are included in the decision-making processes that she participates in, and as she shares both the difficult and resilient history of Inuit in Canada.</p>
	<p>Dr. Olav Orheim, Glaciologist.</p> <p>As glaciologist and climatologist Olav has led numerous scientific expeditions in the Arctic and Antarctica. He was Managing Director of Norwegian Polar Institute 1993 to 2005 and administrated polar research at the Research Council of Norway from 2005 to 2012. Born in Bergen, he acquired his PhD in glaciology at Ohio State University studying the glacier history at Deception island. He worked for four decades at the Norwegian Polar Institute. In parallel he held a professorate in glaciology at the University of Bergen for nearly two decades. Olav was instrumental in the establishment of Norway's permanent Antarctic station. He initiated the Norwegian Glacier Museum at Fjærland and the visitor centre Polaria at Tromsø. He is presently the chairman of the board of the FRAM museum at Oslo and GRID-A in Arendal. Olav has received the Royal orders of St. Olav from Norway, and St. Charles from Monaco.</p>

Appendix F: Guidelines for Visitors to Archaeological and Historical Sites

This document has been approved by Hurtigruten's staff archaeologists.

Visitor guidelines for archaeological and historical sites in arctic Canada

Preamble - Native peoples have lived in Arctic Canada for 1000s of years and they have made their mark on their land. Sometimes these marks are very subtle like a ring of stones that indicates an ancient camp site or a small arrangement of stones which served as a fox trap. Others like grave sites can be more obvious. Hurtigruten has the utmost respect for these sites and our main objective is to always behave so as not to jeopardise them in any way, while at the same time maximizing the education values and awareness of the site. We always have certified archaeologists on board when we are visiting sites in Arctic Canada and carry all the necessary permits required by the Nunavut and Northwest Territories Governments. Visits to archaeological and historic sites are always conducted in small groups under the supervision of the onboard archaeologist(s), and according to guidelines set out by the Government of Nunavut in their document "Class 1 Permit Guidelines and Regulations for Heritage Site Visitation". The following is a list of simple guidelines guests can follow when visiting archaeological and historic sites in Arctic Canada. Thank you for your cooperation!

1. Our archaeologist will give you a mandatory briefing about visiting archaeological and historical sites in Arctic Canada.
2. You will visit archaeological and historic sites in Arctic Canada in small groups accompanied by our onboard archaeologist(s). Do not wander away from the group and obey all instructions from archaeologist(s). Please keep to pathways or flagged routes when requested.
3. A protected area of 30m (90ft) extends around archaeological and historic sites. Do not approach closer if not accompanied by the onboard archaeologist(s).
4. If accompanied by the onboard archaeologist(s), do not approach an archaeological or historical artifact closer than 2-3m (7-10ft).
5. Artifacts can be old or relatively recent. It is safe to consider anything you see that is human-made to be an artifact.
6. Some relatively modern artifacts may look like garbage to you. Do not touch!
7. Do not walk through tent rings or stand on rocks that constitute an artifact.
8. Do not touch, pick up or move any artifact.
9. Do not collect any artifact as a souvenir or write graffiti.
10. Do not move stones or make piles of stones.
11. Animal bones laying on the tundra could be artifacts. Do not touch.
12. In snowy conditions, be very careful not to step on any archaeological or historic artifact.
13. You may be allowed to approach or even enter historic buildings. If so, you will do so in small groups. Do not touch anything on the outside or inside of the building. This includes leaning up against a wall of the building or setting your rucksack or camera bag on any part of the building.
14. We may encounter graves or human remains. Please treat these sites with extra care. These are the final resting places of men and women who died here. When you view the graves, imagine that you are visiting this spot with the family of the person buried there. Behave with the dignity and respect that you would want your own family grave to be treated. Do not put your cameras inside open graves to take photos and do not pose disrespectfully with the graves.
15. If you discover something that you suspect may be an archaeological or historical artifact on a landing, remember the location, take pictures, and report this to your Expedition Leader or the onboard archaeologist(s).